AVIATION WEEK

A McGRAW-HILL PUBLICATION

JULY 26, 1954

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Aviation Week

JULY 26, 1954 VOL 61, No 4

Editorial Offices
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Washington 4, D C.—National Press Bldg., Phone NAtional 8 3414
Los Angeles 17—1111 Wilshire Blvd, Phone MAdison 6 4323

Table of Contents on Page 8 51,735 copies of this issue printed

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Aviation Week is served by PRESS ASSOCIATION, INC., a subsidiary of Associated Press

Research and Marketing Mary Detwiler Smith, Mary Whitney and Jeanne Rabstejnek

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AVIATION WEEK • JULY 26, 1954 • Vol 61, No 4
Member ABP and ABC

Published weekly by McGraw Hill Publishing Company; James H. McGraw (1860-1948), Founder Publication office 99-129 North Broadway, Albany 1, N Y Executive, Editorial and Advertising Offices Mcgraw Hill building 330 W 42nd St., New York 36, N Y Donald C McGraw President, Willard Chevalier Executive Vice President, Joseph A. Gerardi Vice President and Treasurer, John J Cooke, Secretary Paul Montgomery Executive Vice President, Publications Division Ralph B Smith Vice-President and Editorial Director, Nelson Bond Vice President and Director of Advertising J E Blackburn, Jr Vice President and Director of Circulation

Subscriptions. Address correspondence to AVIATION WEEK—Subscription Service, 99-129 North Broadway, Albany 1, N Y or 330 W. 42nd St., New York 36, N Y. Allow 10 days for change of address.

Subscriptions are solicited only from persons who have a managerial or professional interest in aviation Position and company connection must be indicated on subscription orders

Single copies 75¢ Subscription rates—United States and possessions $6 a year $9 for two years, $12 for three years Canada $8 a year, $12 for two years, $16 for three years, payable in Canadian currency at par Other Western Hemisphere and the Philippines, $10 a year $15 for two years, $20 for three years All other countries $20 a year, $30 for two years, $40 for three years. Entered as second class matter, July 12, 1947, at the Post Office at Albany N Y., under Act of Mar. 3, 1879 Printed in U. S. A.

NEWS DIGEST

Domestic

New jet transport to be built by Lockheed Aircraft Corp. will be in the 550-mph.-class of Boeing Airplane Co.'s 707 but under present planning will be larger and heavier, well informed sources report. Four engines are expected to be located in the aft fuselage in a stainless steel compartment, with access provided by a bomb-bay-like door. Airscoops are to be located on the sides of the fuselage behind the 40-deg.-swept wing's trailing edge. The transport is scheduled to get a tricycle landing gear, with the main wheels folding into the fuselage belly.

Engine fire forced a Trans World Airlines' 749 Constellation to return to Washington National Airport July 20 shortly after takeoff. All 38 persons aboard escaped by slide evacuation chutes 70 sec. after the emergency landing.

Negotiations between American Airlines and Air Line Pilots Assn. failed to come up with a solution last week to the proposed strike of AA pilots, called in protest of extension of the eight hour nonstop flight limit but prevented by National Mediation Board intervention.

Despite reports elsewhere, Glenn L. Martin Co. and Convair Division of General Dynamics Corp. do not have contracts to build nuclear powered seaplanes. However, both companies have had paper design study contracts with Navy's Bureau of Aeronautics for more than a year.

Convair C-131B, 'flying laboratory' version of the twin engine 340 transport, is in production at the company's San Diego plant under a new USAF contract. The plane will be used for AF research projects or assigned to firms developing special avionics devices.

Aviation dealers who specialize in purchasing surplus aircraft inventories have organized the Independent Aeronautical Dealers Assn., are holding monthly business meetings in New York's Columbia Club. IADA board chairman Thor Solberg of Somerville, N. J.

Summers Gyroscope Co., Santa Monica, Calif., will develop military variations of its PAR lightplane autopilots under a new contract let by the Army Signal Corps. Systems to be developed: single-axis autopilot to control aircraft roll; two-axis device to check both roll and yaw.

Jacobs Captor Makes First Flight

New Jacobs 104 compound helicopter hovers a few feet off the ground during its official first flight last month near Pottstown, Pa. Initial tests will deal with its helicopter characteristics. Later the wings will be fitted for compound trials, including forward flight utilizing a pusher tail rotor. Designed and built by Jacobs Aircraft Engine Co., the 104 is powered by a 350-hp. Jacobs piston powerplant, has a gross weight of approximately 3,600 lb. and is designed for 170-mph. top speed. Rotor diameter is 36 ft., length is 26 ft. 4 in., height is 10 ft. 10 in. It seats five.

New $7-million USAF contract has been awarded Beech Aircraft Corp. for additional MD-3 and C-26 portable generators for B-47s and other AF jet aircraft.

Temco Aircraft Corp. has received a USAF contract to overhaul and modify 40 North American T-6G trainers at its Greenville, Tex., plant.

Air Force has formed a 16-man advisory group on small business to exchange views on methods of maintaining an adequate supporting structure of small concerns under current and prospective conditions.

Financial

Republic Aviation Corp., Farmingdale, N. Y., reports a net income of $4,590,544 for the first half of 1954, compared with $3,739,300 for the same period of 1953. Sales totaled $166,901,615, dropping from $188,299,571 reported for the first six months of last year. Backlog June 30: $918 million.

Beech Aircraft Corp., Wichita, has declared two 25-cent dividends, one payable July 29 and the second Aug. 11. The first represents the last of the omitted dividends, and the second is a regular payment for the quarter ended June 30.

International

Prototype Comet 3, de Havilland Aircraft Co.'s new 500-mph., long-range jet transport, made its first flight last week at Hatfield Aerodome near Hertfordshire, England. Says test pilot John Cunningham of the 1-hr. 25-min. test: 'She behaved perfectly. Everything worked.'

British Overseas Airways Corp. and its partner on the London-Sydney 'Kangaroo' route, Qantas Empire Airways, are quarrelling over two vs. three-man pilot crews and similar safety standards. Angry Australian sources claim BOAC wants Qantas to eliminate one pilot because of safety record jealousy.

Mach 1 speeds have been reached by the second prototype of France's Sneasc S.E. 5000 lightweight tactical fighter, during test flights.

India's air force is interested in buying 50 Australian-built Sabre Mk. 30s from Commonwealth Aircraft Corp. But reports from Melbourne say the company is unable to accept the order, still has some years of Sabre production for RAAF.

Canadian Pacific Airlines has sold its two Douglas DC-6A cargo planes: one to Northwest Orient Airlines and the other to France's Aigle Azur.

The Aviation Week

July 26, 1954

Picture Credits

7—Howard Levy 14-15—Boeing 18—Sovfoto 20—Aero Design 36—NACA 37—MIT 44—Wright Air Development Center 50-52—Bendix Aviation 55—Curtiss-Wright 56—Temco 67—Warner Bros 78—UAL.

WHO'S WHERE

In the Front Office

W. J. Matthews, former chief of administration and legal services for Canada's Department of Transport, is new chairman of the Air Transport Board.

Dr. Carl A. Frische has been promoted by Sperry Gyroscope Co., Great Neck, N. Y., to vice president-operations, taking charge of the Engineering and Manufacturing Divisions. **E. U. DaParma** has moved up to vice president for special plans and coordination.

Gerow F. Miles has been elected vice president-sales for American Shippers, Inc., New York airfreight forwarder.

Air Vice Marshal A. L. James will join Bristol Aeroplane Co. of Canada, Ltd., Sept. 1 as a member of the board and as vice president-engineering of its subsidiary, Bristol Aero Engines, Ltd. **Peter King,** former press officer for the Society of British Aircraft Constructors, is new public relations officer for Bristol in England.

Henry Salvator, president of Western Geophysical Co. of America, has become a director of Consolidated Engineering Corp., Pasadena, Calif.

Changes

Dr. Winfield W. Salisbury has taken charge of Remler Co.'s new Gray Scientific Division, San Francisco.

George Saum has been appointed manager of the Aircraft Products Division of Taylor Forge & Pipe Works, Chicago.

Homer J. Merchant has been named assistant general manager of sales for United Air Lines.

John W. Larson, chief design engineer on Convair's B-36 project, has joined Chance Vought Aircraft, Inc., Dallas, as staff assistant to the chief engineer.

E. J. Minser has been appointed operations director for Trans World Airlines' central region.

Sy Gottlieb, former staff attorney for Bell Aircraft Corp.'s Helicopter Division, has become executive assistant and contract administrator for Zenith Plastics Co.'s Aircraft Division, Gardena, Calif.

J. W. Baird has been elected assistant secretary of Pacific Airmotive Corp., Burbank, Calif.

Robert L. Wehrli has been appointed director of research and development of the Anaheim Division of Robertshaw-Fulton Controls Co., New York.

L. Byron Post, brother of the late Wiley Post, has become superintendent of production and service for Dallas Aero Service, Dallas.

Honors and Elections

Gen. Robert J. Smith, president of Pioneer Air Lines, has been appointed by the Department of Defense to its subcommittee on special personnel problems.

Allan Bonnalie, flight training director for United Air Lines, is new chairman of an aviation consultant group set up to advise the government's Foreign Operations Administration.

INDUSTRY OBSERVER

► Don't be surprised if a major airline makes a deal with Boeing to fly its Model 707 jet transport on a regularly scheduled transcontinental freight operation. Purpose would be to gain a maximum amount of airline operational experience with the jet transport as soon as possible. Boeing had this in mind and provided for it with large cargo doors in the prototype.

► **Five airframe manufacturers are working on USAF design studies for a military jet tanker (Aviation Week July 5, p. 11). They are Douglas, Lockheed, Convair, Fairchild and Boeing. Results of these studies are due soon.**

► Sperry Gyroscope Co. has developed a new high-power Klystron tube capable of generating millions of watts of radar power that will extend the range of radar and missile guidance systems. The new tube also is aimed at much better frequency stability than previously used magnetrons, permitting greater radar receiver sensitivity and improved operation of moving target indicators.

► **Boeing experimental turboprop version of the B-47 is mothballed while awaiting delivery of the Wright T49 turboprops scheduled to power it. Boeing also is working on a version of the C-97 Stratofreighter powered by P&W T34 turboprops.**

► Indication of Convair's progress on the B-58 supersonic bomber project is the recent shift of Kermit A. Day from head of the San Antonio AMA-SAC B-36 maintenance and modernization program to the newly created job of B-58 assembly manager.

► **Convair's two YC-131C turboprop-powered Convair 340s will go to USAF Flight Test Center at Edwards AFB for Phase 2 flight testing and then to Military Air Transport Service for a rugged shakedown in regular operational transport service.**

► Increasing number of foreign governments are taking advantage of the reimbursable-aid privilege to buy American-built military aircraft at the same prices for which they are sold to USAF. Canada is the leading customer for this type of aircraft sales.

► **Order grounding two wings of Strategic Air Command Republic F-84Fs (Aviation Week July 19, p. 10) has been canceled.**

► Air Materiel Command has approved a program to retrofit all Fairchild C-119s with a co-rotational nose-wheel installation aimed at eliminating nose-wheel shimmy and current maintenance problems.

► **Navy Bureau of Aeronautics has ordered these fixes in the Westinghouse J40 as a result of the McDonnell F3H-1N grounding (Aviation Week July 19, p. 10): cleanup of fuel oil lines, fixes on line seal leakage and a general cleanup of all plumbing, stricter turbine blade inspection, fix in compressor compartment to obtain a better stall margin in the blades.**

► Lockheed already has tested its vertical-takeoff fighter in the crucial transition stages between vertical and horizontal flight. Although the plane is not equipped yet with an engine designed for vertical operation, the company has been taking advantage of the aircraft's auxiliary landing gear to conduct flight tests with conventional landings and takeoffs. While Convair, in its Moffett Field tethering rig, made the first vertical takeoffs and landings, Lockheed thus made first tests of transition performance. The aircraft could not be flown in the vertical position for more than a short period due to the type of engine, but a company source reports it handled smoothly during the vertical-horizontal operations.

► Douglas A2D turboprop Skyshark is undergoing extensive propeller, engine and airframe changes. Much of the data on which these changes are based was obtained during the well-instrumented accident at Edwards AFB when a Skyshark made an emergency landing with its front end looking like an exploded cigar.

AVIATION WEEK

VOL 61, NO. 4

JULY 26, 1954

AF to Increase New Orders for Aircraft

- **$1 billion to be obligated within next four months.**
- **Big chunk to go for new NAA F-100 contracts.**

By G. J. McAllister

Air Force will accelerate its obligation rate sharply during the first four months of fiscal 1955 after reporting only $1.7 billion net obligations in fiscal 1954.

This will be reflected in the aircraft industry by an increase in the number of firm contracts for aircraft purchases previously planned by USAF.

Roger Lewis, Assistant Air Force Secretary for Materiel, says:

- $1 billion from funds for 1954 and prior years will be obligated in the next four months, "a big chunk" of it for North American F-100s. Approximately 75% of fiscal 1954 procurement funds will be obligated by October. Fiscal 1953 procurement funds are currently more than 90% obligated. A total of $6.2 billion was available for 1954.
- About 25% of the total carryover into fiscal 1955 of $4.49 billion was not obligated because of what Lewis terms "bona fide delays" in the program—requirements under review (13.5%) and late validation of requirements (10.5%).
- Gross obligations for 1954 were $3.7 billion, but $2 billion was canceled.

Major reason for non-obligation in fiscal 1954, Lewis says, was USAF's "forward purchasing policy" (AVIATION WEEK Feb. 15, p. 13), the reduced lead time on re-orders of planes already in production that accounted for 37% of the funds not obligated. This is "simply the policy of not placing an order before it was necessary to place an order," he says.

▶**Increased Flexibility**—"We didn't make these re-order periods ourselves," Lewis reports. "We wrote to the manufacturers and got back from each of them for each model what they thought the re-order time should be and we placed orders on that basis," Lewis told a news conference.

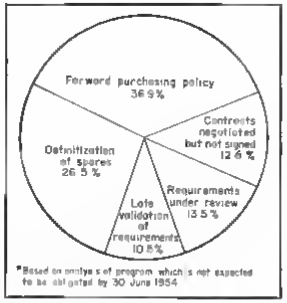
"The adoption of a policy of timing the placement of orders to the re-order lead requirements stated by the manufacturers has made it possible to defer the actual obligation in a number of cases. Thus has the effect of putting our orders on a more current basis, giving us more flexibility to accept engineering changes and a greater ability to schedule our buying throughout the year.

"Production slippages reflected on new schedules have made it possible to defer some follow-on orders. This has encouraged better performance on the part of manufacturers."

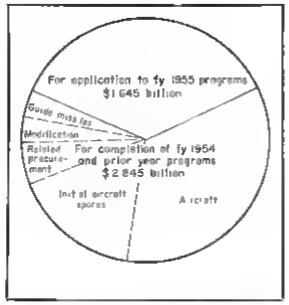
Re-order lead time on aircraft, Lewis reports, has been reduced from 21 to 18 months.

▶**Spares Policy**—Another reason, accounting for 26.5% of the non-obligations in fiscal 1954 was definitization of spares—the process of determining precise spare requirements.

ROGER LEWIS: Order when necessary.



ESTIMATED UNOBLIGATED carryover in aircraft and related procurement appropriation from fiscal 1954.



DISTRIBUTION of $4.490 billion unobligated carryover into fiscal 1955 for aircraft and related procurement.

"These are the spares that you order concurrently with the original airplane, and not the one-year money spares," Lewis explains. "Back in the days when we sort of panicked ... we got into a practice—and it was a good practice—of telling (manufacturers), 'Look, you're going to get so much money for spares and when you find out exactly what you need and can place it, let us know and we'll go ahead ...'

"When we looked at this spares business last year we found that we had spares going back a couple of years and there was no excuse for them not being definitized. So we said 'If you can't show you need this money, if you haven't got your old orders cleaned up, before we give any big commitments we're going to hold up the money and insist on a cleanup of old spares orders.'

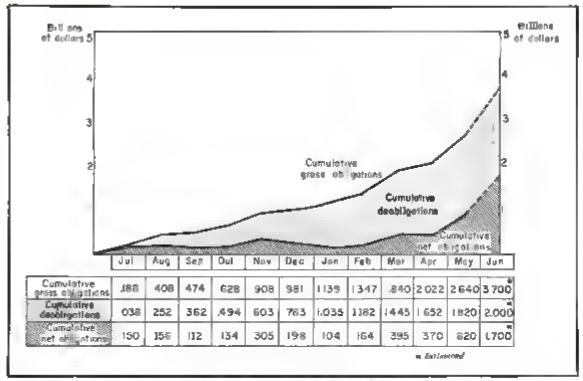
"That has been done and this money is now in the process of being released.

On our new contracts we let a certain percentage go for the long-range materiel program. We protected the current delivery element, but we did make them clean up the old business."

▶**Cancelations**—Contracts negotiated but not signed accounted for the 12.6% balance of non-obligated funds in 1954.

Discussing the cancelation of $2 billion in obligations, Lewis says 40% of the cut came in engines, principally General Electric's J47 (AVIATION WEEK Sept. 28, 1953, p. 14).

Other items involved in the cancelation program were termination of the Beech T-36 program, a substantial reduction in the size of the heavy press



	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Cumulative gross obligations	388	408	474	628	908	981	1139	1347	840	2022	2640	3700*
Cumulative deobligations	038	252	362	494	603	763	1035	1182	1445	1652	1820	2,000*
Cumulative net obligations	150	156	112	134	305	198	104	164	395	370	820	1,700*

* Estimated

CUMULATIVE OBLIGATIONS during fiscal 1954 for aircraft and related procurement

program and cancelation of contracts for 151 Boeing B-47s.

▶**Sounder Practices**—"The slower rate of obligations reflected by this total obligation picture as of the end of the fiscal year is in general, the result of our efforts through the year to return to sounder procurement practices, both in our methods of contracting and the timing of our order placements," Lewis says.

"The tightening of procedures was accomplished while our buying operations proceeded according to plan. Throughout the year commitments to contractors were made in a manner and at a time that has insured the continuation of production to fulfill the requirements of the 137-wing Air Force and to put into production the new equipment necessary to keep the Air Force modern."

Emphasis has been placed on an effort to write firm contracts and to discourage the use of letters of intent, the Assistant Secretary says. "An effort was also made to get previous contracts in order before new contracts were issued for the same item. The result has been that while such an obligation takes a little longer to complete, it is in a far more satisfactory form both to the Air Force and to the contractor."

▶**Peak Receipts**—Lewis says the aircraft industry has not suffered any layoffs because of the obligation rate of follow-on orders.

"There is gradually being felt a slight shrinkage, particularly in the subcontractor level, as a result of the planned taper-down over the next two years of the aircraft program," he reports. "We are now receiving airplanes at about our peak rate and we will do that as our 137-wing inventory fills up. But at some time—and we think it's about two and a half years from now—that inventory rate will have to shrink to a modernization rate, the rate necessary to improve the quality of the Air Force inventory as new planes can be developed.

"The sustaining rate looks to us as if it's going to be about half of the inventory rate."

Lewis points out that the question of the inventory modernization rate is out of the hands of procurement personnel. "It's a technical and scientific capability problem," he says.

Unobligated funds carried over into fiscal 1955 will be used as follows:

- For application to fiscal 1955 programs, $1 645 billion.
- For completion of fiscal 1954 and prior year programs, $2 845 billion.

Lewis says carryover funds of $1 645 billion reduced the need for new appropriations by at least that amount. Congress recently appropriated $2 76 billion for aircraft and related procurement for fiscal 1955, the amount requested by USAF (AVIATION WEEK July 5, p. 16).

He says the $1 645 billion carryover will not affect the fiscal 1956 appropriation request since all of it will be used within fiscal 1955.

Committee Approves AF Building Projects

The $834-million Air Force construction program approved by House Appropriations Committee for fiscal 1955 provides for the Air Force Academy, new strategic and tactical air bases and more than $75 million for expansion of two of USAF's major research and development centers—Arnold Engineering Development Center, Tenn., and Edwards AFB, Calif.

The program is $111 million less than USAF's request of $945 million. The committee provided only $484 million in new money, stating that the balance of the program could be financed from the $1 2 billion in unobligated funds USAF has on hand.

▶**Air Academy Cut**—The fiscal 1955 construction programs approved for Army and Navy were only fractions of USAF's program. Army, $191 million; Navy, $196 million.

The two largest items in the military construction program are $54 3 million for USAF's aircraft control and warning system and $65 million for Army's continental tactical defense system, primarily Nike sites.

The committee voted $15 3 million for launching construction of the USAF Academy, substantially less than the $26 million USAF requested.

▶**AFB Money**—New bases provided for are:

- Clinton-Sherman Airport, Okla., Strategic Air Command, $11 4 million. Total cost will be $35 2 million.
- Myrtle Beach Municipal Airport, S. C., Tactical Air Command, $11.6 million. Total cost $23 8 million.
- Seymour Johnson AFB, N. C., Tactical Air Command, $13 4 million. Total cost $37 8 million.
- Beaufort, S. C., Marine Air Station, for headquarters for the Third Air Wing, $11 1 million. Total cost $52.1 million. Headquarters for other two Marine Corps wings are at El Toro, Calif., and Cherry Point, N. C.

▶**$10-Million Projects**—Other major USAF projects, for which more than $10 million is provided:

- Arnold Engineering Development Center, Air Research and Development Command, $48 7 million. Of the $275 million total estimated cost, $179 million already has been appropriated.
- Edwards AFB, ARDC, $26 7 million. Of the $118 million total estimated cost, $56 million already has been appropriated.
- Robins AFB, Ga., Air Materiel Command, $14 6 million for runways and facilities to accommodate large aircraft—B-36s, B-52s and C-124s.
- Abilene AFB, Texas, SAC, $17 4 million for facilities to accommodate an additional wing under the 137-wing program.
- Altus AFB, Okla., SAC, $15 7 million.
- Homestead AFB, Fla., SAC, $13 2 million.
- Limestone AFB, Me., SAC, $13 5 million.
- Little Rock AFB, Ark., SAC, $11 9 million.
- Lockbourne AFB, Ohio, SAC, $10 6 million.
- Plattsburg AFB, N. Y., SAC, $16 8 million.
- Portsmouth AFB, N. H., SAC, $13 6 million.

WING FLAPS IN LANDING POSITION, brightly painted Boeing 707 jet transport heads south for Boeing Field, Seattle.

FIRST U. S. JET TRANSPORT LANDS at Seattle where company is putting it through an intensive flight test program.

Boeing 707 Starts Flight Test Program

By David Anderton

Seattle—Boeing Airplane Co.'s big 707 jet tanker-transport prototype climbed steeply off the runway at Renton Airport in a dramatic start of its first flight July 15.

One hour and 24 minutes later, pilot A. M. (Tex) Johnston and co-pilot R. L. (Dix) Loesch brought the yellow-and-brown craft in for a routine landing at nearby Boeing Field before a crowd of employes headed by president William M. Allen.

Johnston's comments "... beautiful flight ... beautiful airplane ... handling characteristics are very good."

► **27,000 Ft.**—Two days later, the tanker-transport took off on its second test flight, staying aloft for two hours and 19 minutes and reaching an altitude of 27,000 ft.

On the third flight July 19, the plane reached "operational speeds and altitudes" during a check of emergency procedures that lasted two hours 19 minutes. Emergency procedures also were checked on the fourth flight July 20 of one hour 49 minutes.

► **Delayed Flight**—Originally scheduled for early morning, the 707's first flight was delayed until the afternoon by a heavy mist and low overcast.

By 1:30 p.m., the big plane had been parked along the runway for preflight check and servicing. Johnston and Loesch arrived, just before they climbed into the lower fuselage door. Allen wished them luck.

"You haven't a thing to worry about, Bill," said Johnston. And apparently he did not, because the flight was uneventful.

Allen—along with every other Boeing official—was delighted with the informal comments during the flight.

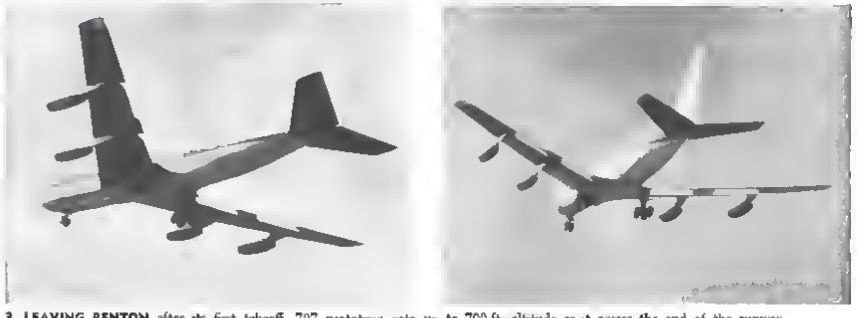
► **17-Sec. Takeoff**—Preflight cockpit check, engine starting and taxiing out took about 10 minutes, the 707 lifted off the runway at 2:14 p.m., after a 17 sec. takeoff run that used less than 2,100 ft. of the runway. There was about 700 ft. under the plane as it passed over the end of the 5,400-ft. flight strip.

First reaction from the crew came shortly after the start of climb. "Every-

1 AIRBORNE after using less than 2,100 ft. of Renton's 5,400 ft. runway, Boeing 707 starts to gain altitude quickly.

New Boeing Jet Climbs Fast On First Takeoff

2. STEEP CLIMB is aided by power of four 10,000 lb. thrust P&WA JT3 Ls (J57s).



3. LEAVING RENTON after its first takeoff, 707 prototype gets up to 700-ft. altitude as it passes the end of the runway.

thing's real clean and steady," reported co-pilot Loesch.

First detailed report to the ground was made by Johnston. "We've been climbing to approximately 8,700 ft., airspeed is 145 to 150 knots (167-173 mph). All engines are operating normally, hydraulic pressures are okay. It feels comparatively good."

Johnston later reported slight stick shake and attributed it to either landing gear or flap buffet, later inflight observation showed that there was some vibration of the skin on the outboard flap.

▶**Peak Altitude**—Fifteen minutes after takeoff the plane reached 20,000 ft., peak altitude for the flight.

Final approach to Boeing Field was made from the north, with the plane coming in flat and under power. The 707 touched down near the start of the runway, bounced a little and rolled to a stop.

Gross weight for the flight was about 110,000 lb., well below the plane's normal gross of 190,000 lb.

The Boeing jet prototype has a wing span of 130 ft. and a length of 128 ft. Powerplants are four P&WA JT3-L turbo jets (commercial J57s) rated at more than 10,000 lb. thrust each.

707 Eye Appeal

SEATTLE—The color scheme of the Boeing 707 jet transport—yellow, brown and silver—adds considerably to its eye appeal. Its performance—even for a lightly loaded prototype—was amazing at takeoff. It leaped into the air long before we expected it to be airborne, was much higher at the end of the runway than the original 100-ft. estimate given us by a Boeing flight test engineer.

The fact that inflight pictures show wheels and flaps down does not mean they never were up. The photo plane and the 707 lost radio contact and the picture takers couldn't request Tex Johnston to pose for them.

Second flight was made late in the afternoon July 17, and Tex retracted the gear soon as he was airborne. The 707 swung into a tight turn and climb. An F-86 near it had a tough time keeping up with the big transport. Some performance!

There still are no 707 orders.

The July 15 first flight date was the 38th anniversary of signing of articles of incorporation of Pacific Aero Products Co., which later became Boeing. Firing date of incorporation however, was July 22.

Project engineer Maynard Pennell was in Washington at the time of first flight and did not get to see the 707 fly.

—DAA

Victor Crash

- **Horizontal stabilizer rips off RAF bomber in flight.**
- **Accident raises doubts on high-placed tailplane.**

(McGraw Hill World News)

LONDON

Crash of the Handley-Page Victor crescent wing bomber (AVIATION WEEK July 19, p. 7) has raised serious doubts here about the practicability of horizontal tail surfaces located high on the vertical stabilizer—right on top in the case of the Victor.

The Victor crashed under conditions similar to those that ended the short life of its smaller experimental predecessor, the H.P. 88.

▶**Tail Wobble**—The Victor, one of two heavy bomber designs on order for the Royal Air Force with "super priority" production ratings (other is the Avro Vulcan), was making low altitude speed calibration runs. It had completed two and was coming over for the third when this series of events proved fatal.

There was a slight unplanned "interruption of control" and the plane nosed down slightly. It recovered. The tail began wobbling, then ripped completely loose. The Victor held steady for a fraction of a second, then dived into the ground.

Indications are that some kind of sympathetic vibration (resonance) occurred which proved too much for the Victor structure. The Gloster Javelin experienced similar troubles with its high tail.

The Victor's tail structure was supposed to have been strengthened after the H.P. 88 (modified Supermarine Attacker) worked itself into small bits.

Observers say the Victor was less than 100 ft. above the field, traveling at about 400 mph. when its tailplane came off.

▶**Terrific Force**—This brings up considerations of the terrific force that must be imposed at high speeds by such a highly placed horizontal stabilizer. The drag on this surface is great even when fixed firmly to the fuselage. However, when the tailplane is located on the vertical fin, a simple force becomes a moment with leverage that increases rapidly the higher the surface is placed.

The condemning circumstance in the case of the Victor is that the disaster occurred in straight and level flight under relatively calm conditions.

Supporters of slung pod engines are re-airing their views as a result of this latest British aviation disaster. Idea of the high mounted tail was to keep it well clear of the jet stream of the burned engines as well as from the wing wake.

▶**Bomber Program**—The crashed plane was the only one of its kind, although a second prototype is due to fly this fall at Farnborough.

While the Victor crash may give the Avro Vulcan an edge for heavy bomber production, the main point stressed here is that Britain will have to rely on the smaller Vickers Valiant bomber for some time.

The Valiant will be the first in squadron service. It was designed in 1948 as an interim plane until the Victor and Vulcan, designed in 1946, were ready. The Valiant may well end up carrying bulk responsibility for that class in Britain's air forces.

Hughes Reveals Top Management Staffs

Los Angeles—Hughes Aircraft Co. has revealed its management staff for the first time since the shakeup last October in which a number of top officials left the company.

Hughes' office says the company still is looking for a top ranking industrialist to replace William C. Jordan, who resigned as executive vice president-general manager last month (AVIATION WEEK June 28, p. 14).

▶**Management Link**—The list also discloses for the first time a management relationship between Hughes Aircraft Co. and the recently created Aircraft Division of Hughes Tool Co.

Howard R. Hughes reorganized his aircraft holdings last January and set up the Howard Hughes Medical Institute. At that time he severed the aircraft company from its parent concern, the Hughes Tool Co. It was reported that a "substantial part" of the aircraft company was turned over as the initial donation to the medical research institute, making it sole owner of Hughes Aircraft Co. (AVIATION WEEK Jan. 18, p. 14).

The Aircraft Division of Hughes Tool Co. retained such projects as the flying boat and the giant helicopter. Hughes Aircraft Co. is primarily an avionics concern.

Hughes is president of both companies.

▶**Top Staffs**—The management list shows the following vice presidents for Hughes Aircraft Co.: general counsel, H. B. Hull; director of research & development—missile, N. I. Hall; plant manager electronics, R. B. Parkhurst; director of research & development—radar, R. J. Shank; plant manager—missile, W. W. Wooldridge.

Below the rank of vice president are director of research & development Jobs, A. V. Haeff; administration director, L. H. Scott; controller, E. G. Hill; director of contracts & program, R. E. Wendahl; director of aircraft operation and flight test, C. A. Shoop; director of field service and support, E. M. Boykin; acting director of semiconductor, J. S. O'Flaherty; industrial relations director, W. G. Tuttle; director of industrial security, J. P. McCarthy; quality control director, D. A. Hill; chief of materiel, S. H. Bellue; procurement manager, O. D. Berry; general purchasing agent—research & development, D. Patrick; general purchasing agent—production & plant, J. G. Beamish; purchasing agent—subcontracts, K. E. French.

Management staff for the Aircraft Division of Hughes Tool Co.: vice president and liaison representative, Gen. Ira C. Eaker; vice president, R. H. Sherwood; vice president and general manager, R. E. Hopper; director of facilities & construction, J. R. Jerman; administration director, W. D. Reed; controller, W. B. Garoutte; quality control director, L. P. Sonsini; director of manufacturing, W. W. Lampkin; director of engineering, C. B. Jones; Long Beach plant director, W. L. Berry; director of contract administration, P. B. Proctor; industrial relations director, A. M. Clark; general counsel, C. E. Schaaf; and director of procurement, M. E. Taylor.

PAA Orders 15 DC-7Cs

Pan American World Airways' $33-million order for 15 of the new, longer-range Douglas DC-7Cs for delivery early in 1956 has stirred industry speculation on the immediate future role of turbojet transports.

Some industry observers believe the PAA order will have a strong influence on prolonging the future of propeller driven aircraft as a mainstay of airline operations for at least the next five years. Pan American earlier ordered seven DC-7Bs from Douglas.

PAA's order came just a few days after the Boeing 707 jet transport flew for the first time (see p. 14). The airline has a contract with de Havilland Aircraft for three long-range Comet 3 jet transports and an option for seven more of the planes (Aviation Week Oct. 27, 1953, p. 13).

PanAm is expected to use the Douglas transports on its North Atlantic routes.

Big difference between the DC-7C model, now entering production, and the earlier DC-7 models is increased engine power, enlargement of the external configuration, increased fuel capacity and consequent range extension.

The DC-7C's wing is 127 ft., 6 in. long, 10 ft. longer than the DC-7 wing. Vertical stabilizer and rudder has been extended approximately two feet in height.

The new version will use the DA-4 model of the Wright R3350 Turbo Compound engine providing an additional 20% power. Inboard engines will be located five feet further away from the fuselage. This is made possible by an extension of the new transport's wing root.

Position of the engines will allow a 70-in. clearance between the propeller tips and the fuselage, resulting in a noise level more comparable to that of the DC-6B. The noise level of the DC-7 has been a source of criticism and concern among the airlines now flying the earlier models.

Fuel capacity in the DC-7C has been increased from 6,400 gal. in the DC-7B to 7,860 gal., giving the airplane a range of more than 5,000 mi.

Pan American claims it will be able to carry up to 58 passengers in the DC-7C plus baggage, cargo and mail with provision for more than 1,200 gal. of reserve fuel after flying nonstop for 5,000 mi.

The new aircraft has been designed for 140,000 lb. gross takeoff weight and 107,000 lb. for landing.

$22-Million Airport Aid Voted by House

House has approved the Administration's request of $22 million for federal aid to airports, reversing an Appropriations Committee decision which flatly refused to reinstate the program.

The 157-to-61 approval came after President Eisenhower told congressional leaders he wanted the fund restored.

This virtually assures a $22-million appropriation by Congress. Sen. Pat McCarran and other key senators on the Commerce Appropriations Subcommittee do not believe the $22 million proposed by the Administration is enough.

▶**'Propaganda'**—Rep. Prince H. Preston, Jr. who sponsored the move, told the House that local communities have sold $78 million in municipal bonds on the assumption they would get federal funds to help build airports.

Rep. John Taber, Appropriations Committee chairman, said House members had been "bunkoed by propaganda."

Other developments were:

▪**New international facilities.** CAA asked $600,000 for construction of air navigation facilities at Cold Bay, Alaska, and $860,000 for operation of the Cold Bay installation and an installation at Balboa, Canal Zone. The House approved the projects but directed CAA to finance them with funds out of its regular fiscal 1955 appropriation.

▪**Elko, Nev., Airport.** The House approved $69,499 for damages during the 1952 "haylift" by heavy military aircraft. This reversed the action of the Appropriations Committee, which refused the money.

▪**Washington National Airport.** The $400,000 requested to establish the airport as a separate corporation was turned down, since legislation authorizing the incorporation has not been passed—and probably will not be (AVIATION WEEK July 19, p. 20).

The House committee gave CAA less than a day's notice to appear in defense of the airport money and its other requests. CAA Administrator Fred Lee was out of town. The task of supporting the program fell to Assistant Secretary of Commerce for Administration, James Worthy.

▶**Opposition**—At hearings Appropriations members were antagonistic to the airport program.

▪Rep. Cliff Clevenger, chairman of the Commerce Appropriations Subcommittee, argued if federal money is used to finance airports the railroads would be justified in demanding federal money for transportation facilities.

He observed: "Suppose the new management of the New York Central would find that it needed a couple of hundred million dollars for new stations and new passenger facilities. Is it any more fantastic to expect that they might request and be entitled to it, inasmuch as they have also been paying for this airport program . . ."

▪Rep. John Rooney, ranking Democrat on the subcommittee, suggested that "we should be moving the other way—making the airlines build and carry their own airports . . ."

Player to Join ATA

Willis Player, special assistant to the Assistant Secretary of Navy for Air, has been appointed director of public relations for Air Transport Assn. Elmer D. Thompson remains as director of information for the association.

Player, former vice president of Northwest Orient Airlines and onetime public relations director of Pan American World Airways, will join ATA Sept. 1. He will finish his special Navy assignment sometime in August.

During World War II, he was with the Air Combat Intelligence Division of the Navy. He has worked for Booth Newspapers, Inc., Chicago Daily News and the Wall Street Journal. He is a graduate of the University of Michigan and now lives in White Plains, N. Y.

Slick Anti-Trust Suit To Get New Hearing

Slick Airways' $30-million anti-trust conspiracy suit against American, United, and Trans World Airlines is again active—after four years' delay due to legal jurisdictional dispute.

Airline attorneys are expected to continue taking depositions for almost an other year.

The case tentatively is set to come up before the U. S. District Court, Trenton, N. J., in October 1955.

▶**Triple Payment**—Slick's suit claims damages of $10 million against the three airlines and their "agent," Air Cargo, Inc., and says law "commands" the payment be trebled.

Declaring that 300 out of 544 shares of Air Cargo are owned by American, UAL and TWA, the suit charges that the association's policies "have been dominated and directed" by the three airlines.

The three airline defendents first had sought to have jurisdiction over the case assigned to Civil Aeronautics Board.

The district judge twice ruled that an anti-trust proceeding was a matter for court, rather than regulatory agency, jurisdiction. The U. S. Court of Appeals for the Second District upheld this decision.

Last October, the U. S. Supreme Court declined to hear the case, paving the way for a showdown court case to be conducted before the Trenton district court.

▶**Three Scores**—The suit alleges that the defendent airlines "conspired to monopolize, monopolized and attempted to monopolize airfreight transportation" and "conspired to restrain trade or commerce" on these three scores:

- By a "deliberate attempt through predatory rate policies and a process of attrition to waste the resources of (Slick) and other freight carriers and to cause them to operate at a substantial loss."
- By "the abuse of the privilege of intervention and participation in CAB proceedings."
- By a "campaign of unfair competitive practices designed to appropriate" Slick's freight business.

The suit charges American, UAL, and TWA with an "organized, rehearsed and well planned campaign" before CAB, "conspiring first to block the issuance of a certificate (to Slick), if possible to do so, and second to delay it for the greatest possible length of time—well knowing that the issuance . . . would substantially increase (Slick's) ability to withstand (their) predatory rate practices and unfair competitive practices . . ."

Russian Jets, Copters Buzz Spectators

Sweptwing Russian jet fighters (above) and seven LAR3 helicopters (left) fly close over the heads of Russian spectators during the annual aviation day celebration at Tushino Airport near Moscow last May. Pictures were distributed only recently by the official Russian picture agency, Sovfoto.

The jets appear to be MiG-15 single-seaters. Nine are visible as they fly a fairly tight formation. In the original print they appear to be only a few hundred feet over the crowds.

Seven Russian copters are seen, also at low altitude, a practice prohibited at U. S. air displays for safety reasons.

First view of this craft appeared in Aviation Week Nov. 23, 1953, p. 20. Resembling the Sikorsky S-55, the Russian copter features a four-blade main rotor. An unidentified coffin-like bulge is under the belly just behind the nose.

Foreign observers received their first view of new large Russian bombers powered by 15,000-lb.-thrust-class jets during this year's May Day celebrations (Aviation Week May 31, p. 12).

BOAC to Buy U.S. Stratocruisers

British airline negotiates for UAL, PAA 377s and Qantas 749 Connies to replace Comet 1 fleet.

British Overseas Airways Corp. is negotiating with United Air Lines and Pan American World Airways to buy UAL's entire fleet of six Boeing Stratocruisers and two from PAA to replace its grounded de Havilland Comet 1s.

BOAC also has purchased one Constellation 749 from Lockheed Aircraft Corp. and is working out final terms of an agreement to buy an additional four Connies from Qantas Empire Airways.

"And we're trying to find someone who has three more 749s for sale and will make them available when we want them," a New York spokesman for BOAC told AVIATION WEEK. "We want to buy from an airline."

The purchase plans confirm a forecast two months ago that the British international airline would be forced to buy U. S. equipment to fill gaps left in its fleet after BOAC's six Comet 1s were grounded by three crashes (AVIATION WEEK May 10, p. 13).

▶**Unmarked Price Tags**—British Overseas already has agreed in principle to buy United's and PAA's Stratocruisers. Still to be worked out are the price tags, delivery dates and purchase terms.

The airline spokesman says UAL's 377s will require cockpit modifications and propeller changes but Pan American can go into service with slight revisions.

The Boeing transports are scheduled for operation on BOAC's trans-Atlantic route, mainly in aircoach configuration.

Unconfirmed reports early last week said BOAC was trying to lease eight Constellations and eight Stratocruisers, and a company release said only that the airline was trying to "acquire" the transports.

The New York spokesman says his company had considered leasing the U. S. equipment but dropped the idea early in the negotiations.

▶**Encouraging Profit**—In London, meanwhile BOAC board chairman reports a net profit of $182,000 for the first quarter of fiscal 1954/55 despite the loss of its Comets during the first month of the April-June period.

"True, the amount is sadly below what we had budgeted to make with Comets in operation," he says, "but nonetheless, the figure is encouraging.

"Naturally, withdrawal of Comets has been a body blow to BOAC. We were pioneering this highly attractive form of advanced and speedy air travel. It is, even at this stage, inappropriate to make definite statements about precise mechanical causes of the disastrous troubles.

"Nonetheless sufficient has been disclosed to support the faith that—modified, tested and proven on the routes we have established ourselves—the Comets will fly again."

▶**Comet Future**—The airline expects to put its 12 Comet 2s into operation as soon as they are delivered after the Royal Aeronautical Establishment at Farnborough reaches a decision on the cause of the jet transport crashes. The Series 3s will be placed into service with Equal speed.

A BOAC source says the Comet 1s also may resume operation if the Farnborough verdict is clear cut and shows the trouble can be fixed.

When the Comets are put back into operation, BOAC will dispose of the Lockheed Constellations it now is buying. The Stratocruisers will be replaced as the British airline takes delivery on 33 turboprop Bristol Britannias.

Feeder Outlook

- **Permanent certificates win approval in House.**
- **Senate will take action soon on similar measure.**

Two developments have heightened the prospect that Congress will dictate through legislation permanent certificates for local service airlines to Civil Aeronautics Board.

- The House unanimously and without debate passed a measure sponsored by Rep. Carl Hinshaw, that would require CAB to grant permanent certificates to the existing 14 local service lines as "the first essential step" toward the goal of "subsidy-free, adequate air service to the small communities in the country."
- Sen. Pat McCarran introduced an identical measure in the Senate promptly scheduled for action by the Interstate and Foreign Commerce Committee.

▶**CAB 'Wisdom'**—Recommending the legislation, the House Interstate and Foreign Commerce Committee applauded the "wisdom" of CAB in authorizing local service lines, rather than trunk carriers, to develop local traffic, and declared:

"It would be a disastrous mistake for CAB to reverse this policy at this state. The trunk airlines are geared for long-haul operations and, if required to serve these small communities, would provide only the minimum service ordered. This would undoubtedly cause a serious drop in traffic and completely frustrate all that has been developed in the past five years by the local airlines."

▶**'Vicious Circle'**—The committee pointed to the "vicious circle" under which local lines cannot replace uneconomic DC-3s because of their temporary certification and cannot obtain permanent rights because their operations are not economic.

"One of the principal objects of this legislation is to break that circle and encourage the development of a suitable aircraft for the local service airlines."

Other House committee points:

- Instead of turning local service points over to trunklines, the feeders should be given access to the large traffic centers. "The Board can strengthen route structures by adding new points, particularly strong terminal points or by removing or reducing service to weak points," the committee proposed.
- Apparently attacking CAB's refusal to consider the capital investment of Pioneer Air Lines in Martin 2-0-2s in setting the carrier's mail rate, the committee observed: "It appears that the CAB has been unduly severe.

"Where one carrier is retroactively penalized in a mail rate conference for business decisions previously taken with the knowledge of the Board, the consequent damage to the future initiative of all carriers exceeds the immediate monetary saving to the government. The Board has responsibilities which it must observe, but on the other hand it must allow carrier management a sufficient amount of discretion and initiative to enable them to fully develop their companies."

- Permanent certification, the committee declared, will enable CAB to "devote the time previously spent on periodic renewal proceedings for the local airlines in a continuing effort to strengthen these carriers."

Piasecki Reinforces H-21 Rotor Blades

USAF has approved a modification program for the Piasecki H-21's rotor blade and the helicopter—grounded since mid-May—will go back in operation as fast as installations can be made.

A metal reinforcement is being installed on the blade's trailing edge, following investigation of a cover failure at Edwards AFB "caused by variations of the wood properties of this particular blade." Piasecki says its engineers, assuming that every H-21 blade could have this weakness, designed and tested the reinforcement.

The H-21 blade is made to Piasecki specifications by the Parsons Corp., Traverse City, Mich.

PAA Asks New Rates To Aid Air Securities

The air transport industry needs a new mail rate policy to help re establish public confidence in airline securities, according to Henry J Friendly, general counsel of Pan American World Airways

In testimony before Civil Aeronautics Board on the trans-Atlantic final mail rate case, Friendly said present policies are hampering development—particularly in the international field where airlines depend on government aid

▶**Security Doldrums**—Rates of return on investment, fixed by the Board as reasonable for international operations, are too low and their attainment too uncertain to attract capital, he said Friendly adds that airline securities have remained consistently in the doldrums despite the fact that the nation is enjoying the biggest boom market in its history

PAA's counsel quoted Robert B Murray, Undersecretary of Commerce for Transportation, who said recently "We must face the fact that, in general, the man with a dollar to invest does not yet regard the air transport industry as a particularly desirable place for his money."

A recent report by the Aviation Securities Committee of the Investment Bankers Assn. said "Investory confidence in the air transportation industry is at one of the lowest points that it has been since the Civil Aeronautics Act was passed in 1938" (AVIATION WEEK July 12, p. 42)

Friendly referred to that portion of the report which said "In recent years, the interpretation of the act appears to have taken on an increasingly restrictive character, to such a degree that, in our opinion, the carriers operating services requiring government financial support are not receiving the income necessary to enable them to maintain and continue the development of air transportation to the extent and of the character and quality required for the commerce of the U. S., the postal service and the national defense."

▶**5% Return**—Pan American's rate of return since the war has averaged 5%, Friendly told the Board, "well below the return of stable electric utilities whose investors face nothing like the risk international airline investors run. In consequence its stock is selling at only two thirds its book value," he said

Current rate making policies of the Board do not take into account present-day problems of obtaining capital, Friendly said. A new and broader approach is needed if the Board's duty to develop the air transport industry is to be fulfilled, he added

Aircraft Builders Need Higher Profit: Yeasting

Los Angeles—The aircraft industry needs greater financial strength if it is to carry out its responsibilities as one of the largest manufacturers cautions J. O. Yeasting, vice president finance of Boeing Airplane Co.

"We are a very important segment of the national economy," the Seattle executive told the Los Angeles Society of Security Analysts last week.

To maintain their free enterprise position in the national economy, Yeasting believes airframe manufacturers should receive a higher margin of profit on their volume of business.

Boeing realized about 2% net on last year's business, Yeasting says, and expects "3% to 3.25%" this year due to revision of the excess tax structure.

▶**Increasing Costs**—The aircraft executive points out that complexity of new airplanes is increasing costs. Comparing the B-17 of World War II with the B-47 now rolling out of Boeing's Wichita plant, Yeasting says:

"Where the B-17 had little electronic equipment, the B-47 has more than 1,000 tubes, each of which costs three times as much as a 21-in. television tube."

Windtunnel testing was a mere 150 hr. on the B-17, compared with 6,000 hr. on the B-47.

▶**Future Money**—Extensive research and development is necessary for future aircraft and missiles and "more money should be available for the job." Yeasting warns.

"In the best interest of the citizens and military security, it would be best if the government would promote financial strength for the job that lies ahead," he says.

We have gone some way in leveling out the peaks and valleys in aviation but an effort must be made to bring about more stability. "There still are too many starts and stops in the business," Yeasting says.

Convair to Hire 1,000 For Weapons Projects

San Diego, Calif.—Convair will add more than 1,000 engineers and technicians to its engineering department during the next year for work on several highly restricted projects, chief engineer Frank W. Fink reports.

Development work on the projects already is underway and hiring will start immediately, he says.

Convair will send personnel interviewers to major cities and colleges in the United States to explain employment opportunities to applicants.

Four hundred of the new personnel will be assigned as electronics engineers and technicians to long-range projects under development for the armed forces.

Additionally, specialists in aeronautical engineering are needed.

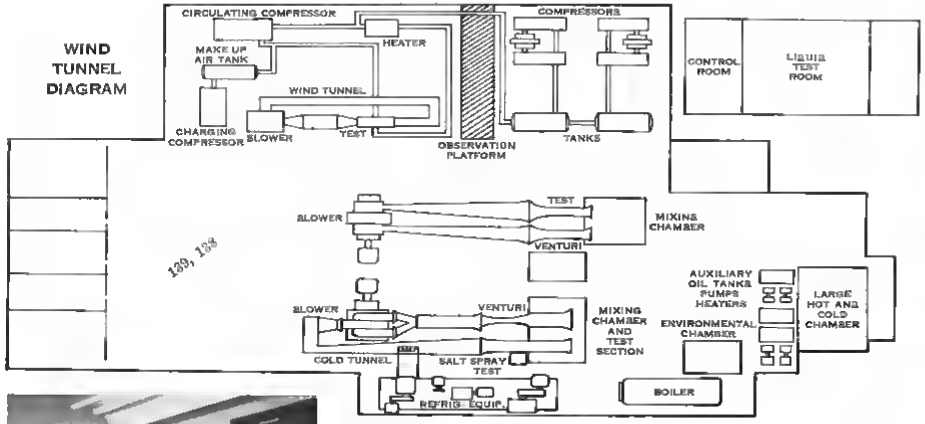
SBA Aircraft Loans

Small Business Administration has announced four loans to small aviation and electronics firms.

They are: Resdel Engineering Corp., Los Angeles, electronic research and development firm, $81,000; The Aid Corp., Clayton, Ga., manufacturer of aircraft parts, $75,000; Texas Tool & Machine Co., Ft. Worth, Tex., manufacturer of aircraft tools and gages, $25,000; Oregon Electronic Manufacturing Co., Portland, Ore., manufacturer of electronic equipment, $75,000.

New Three-Blade Hartzell Props

First view of Hartzell's new three-blade propeller for light aircraft (Aviation Week Sept. 21, 1953, p. 15) shows them installed on the swept-tail Aero Commander 560, twin-engine business plane that recently went into production. The new Hartzells have metal blades and are full feathering with hydraulic control. In addition to the Aero Commander 560 installation, they also are going onto the earlier 520. They are said to give less vibration than two-blade type, quieter and add about four miles per hour to cruise speed. Price $2,180 a set with two-blade props in exchange.



Empirical data developed by the Clifford Wind Tunnel Laboratory over many years permit a quick, accurate "translation" of thermodynamic theory into practical design without the necessity of developing successive pilot models to achieve a satisfactory exchanger.

Clifford's Wind Tunnel Laboratory...

The largest technical facility of its kind is expanding to meet the increasing problems of aircraft and missile heat exchangers, valves and temperature controls.

Basic to the aircraft industry's attack on the thermal barrier are laboratory facilities capable of accurately reproducing the conditions encountered by aircraft in actual service.

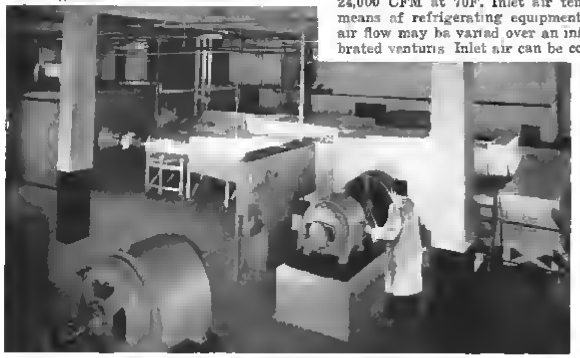
As designers work for higher speeds over a greater altitude range, the heat transfer problems associated with maintaining the lubricating oil at optimum temperature became increasingly difficult. So do heating or cooling the cockpit, cabin, bomb bays and other areas.

Meeting these problems requires a continuous program of basic research, development and testing of heat exchanger systems.

Clifford's wind tunnel, the largest, most complete installation exclusively devoted to aircraft heat exchangers, permits highly accurate simulation of service conditions.

A hot tunnel for testing oil-to-air heat exchangers up to 36" in diameter has a design airflow capacity of 48,000 CFM at 70F. Air flow may be varied over an infinite range of values and is measured by means of calibrated venturis. Temperature may be controlled to within plus or minus one degree F.

A cold tunnel having a test section diameter of 24" has a design air flow of 24,000 CFM at 70F. Inlet air temperatures as low as —70F are attained by means of refrigerating equipment of 120 tons capacity. As in the hot tunnel air flow may be varied over an infinite range of values and is measured by calibrated venturis. Inlet air can be controlled to within plus or minus one degree F.



A circulating system which can deliver air at 1375 pounds per minute at 100F to the test section of either tunnel maintains constant temperature through a 3 way valve and recorder-controller. Flow is measured automatically by electronic scales incorporated in a dead weight weighing system.

A new tunnel facility which provides air at 1200F is designed to test aluminum and stainless steel air-to-air heat exchangers. This tunnel simulates compressor bleed conditions with flows up to 180 pounds per minute at 1200F and 250 psi. Special carbon ring compressors are used and a gas heater with a rated capacity of 3,500,000 BTU per hour maintains bleed air temperatures. Ram air conditions can be closely simulated by a 75 hp. blower rated at 4600 CFM at 70F and a 5.1"Hg. head.

A valve blow down test facility utilizes air from the compressors at 250 psig and at flow rates of 120 LB/m. Tied in with the gas heater, outlet temperatures up to 1200F can be developed for the testing of butterfly valves.

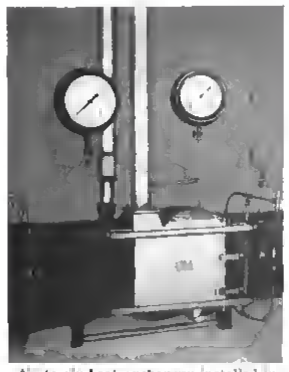
Liquid-to-liquid heat exchangers such as lubricating oil coolers are tested for performance with equipment capable of producing fuel flows up to 1000 pounds per minute and pressures as high as 3000 psi. Oil flows up to 500 pounds per minute at operating pressures of 300 psi and temperatures up to 500F are available for these tests. Multiple fuel and oil storage systems permit various test fluids to be employed.

Other facilities include a controlled temperature test room measuring 31' long, 14' wide and 13½' high. Temperatures from —70F to 150F can be maintained at wind velocities up to 60 mph.

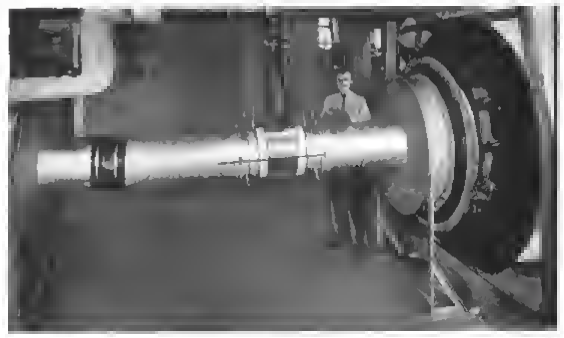
An environmental test chamber of 27 cubic feet capacity provides a controlled range of conditions from —100F to 225F temperature extremes and 5% - 95% relative humidity. Altitude pressures can be simulated from sea level to 80,000 feet.

Complete chemical and metallurgical facilities are maintained and in addition, considerable specialized equipment of a highly advanced type has been designed and built by the Clifford Company in connection with its proprietary processes and methods.

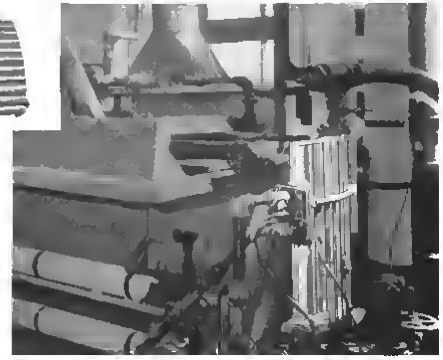
Representative heat exchangers and associated valves designed and produced by the Clifford Company for application in military and commercial aircraft. Inset: stainless steel air-to-air heat exchanger.



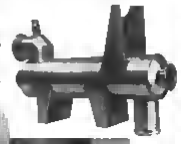
Air-to-air heat exchanger installed in wind tunnel test section. This is one unit of an aircraft air-expansion turbine refrigeration system under test.

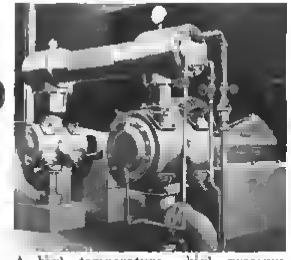


Cylindrical oil-to-air cooler undergoing performance tests.



Oil-to fuel heat exchanger on test. Inset: typical jet aircraft oil cooler.





A high temperature — high pressure carbon ring compressor.

Clifford Manufacturing Company, 136 Grove Street, Waltham 54, Massachusetts. *Division of Standard Thomson Corporation.* Sales offices in New York, Detroit, Chicago, Los Angeles and Waltham, Mass. 7.4.13

Battle Report From Indo-China: Third of Series

C-119 Score: 'Nearly Perfect'

Handful of Fairchild Boxcars, aided by C-47s, starred in epic holdout, flying supplies into 'suicide pocket.'

(McGraw-Hill World News)

Tourane—Dienbienphu was a costly military fiasco that has scaled the fate of north Vietnam and, perhaps, of all Indo-China. But it should be remembered as an interesting aerial supply operation.

More than 7,000 tons of military supplies were dropped into the French garrison between Mar. 13, when the Communists attacked, and May 7 when the position was overwhelmed.

Part was parachuted from C-47s, but just over 5,000 tons went down out the gaping rear-ends of C-119s, loaned to France by the U. S. Air Force. Without the C-119s, it is estimated that the garrison would have run out of supplies by mid-April. C-47s could not have carried the heavy load.

▶**Suicide Run**—Dienbienphu sits in a cup of mountains. The valley floor is at an altitude of approximately 2,000 ft., with the mountains rising to 6,000 ft.

French positions were located in a small pocket on the floor of the valley, while the Communists held the mountains all around. The Reds moved anti-aircraft guns onto the heights, at the end of the battle, more than 100 37-mm. guns were in action on the Communist side.

Aircraft supplying Dienbienphu descended into the cup to make the drops. Until Mar. 27, C-47s went down to 1,500 and 2,000 ft. above the valley, or 2,000 ft. below the lip of the cup.

Each C-47 had to make 20 passes before kickers could shove the full load out the door. This was time consuming, so much so that it would have been impossible to put enough C-47s over the drop point per day to keep the forces adequately supplied. More important, the slow dropping procedure meant that the C-47s were circling in a well defined pattern right in the center of the circle of ack-ack for periods of 20 min. or more.

By Mar. 27, seven C-47s had been shot down. With these losses, the French decided to have the C-47s drop from 8,000 ft., i.e. 6,000 ft. above the drop zone, during the day. Only at night did they venture down to the 1,500 and 2,000 ft. level.

▶**Near Perfect Score**—The C-119s, on the other hand, dropped their heavy loads (seven tons) in one pass with near perfect accuracy. They seldom were in the zone of maximum ack-ack fire for more than three minutes. Only during the last week did the intensity of Communist fire drive them up to the C-47 level.

Another characteristic of the C-119 that met the approval of its French Air Force and American civilian pilots was its ability to absorb damage suffered in battle.

Red gunners hit 57 Boxcars during the battle. All but one returned safely. That one, piloted by the legendary James B. (Earthquake McGoon) McGovern, almost made a successful crash landing in a river bed after skimming across several ridge tops. At the last second, a wing tip hit a tree on the river bank and the aircraft rolled in.

▶**Bulldozers Drop**—American civilian pilots of Civil Air Transport, Gen. Claire L. Chennault's airline, flew the C-119s during the day, while French Air Force transport pilots flew them at night.

During the Dienbienphu operation, CAT pilots made 540 missions and dropped 3,240 tons. French flyers handled missions accounting for just over 2,000 tons.

Ammunition, rations and barbed wire made up most of the cargoes. The largest pieces of equipment were two seven-ton bulldozers. The first fell free after the straps broke, so a second 'dozer was parachuted into the position.

French officers estimate that 95% of the supplies dropped from the C-119s fell within the drop zone.

▶**Flying Tower**—The C-119s were limited to two one-hour periods per day over the drop zone. The rest of the day was reserved for C-47s.

At night, the French Air Force maintained a flying control tower (a C-47) over the embattled position.

FAF is proud that no planes were lost on the shuttle operation from the major bases near Hanoi and Haiphong, despite the total lack of any radar control.

The only navigational aids in Dienbienphu were a French Gonion (radio homer) and a VDF (very high frequency direction finder) set. During the last few days the latter was very bad.

▶**Complicated Plane**—CAT pilots said of the C-119: "It's a good airplane for taking a big load and dumping it, but that's about it." They claimed the old C-46 carries nearly as much at less cost but does not seem to have that important characteristic of dumping loads fast.

The C-119 also is a complicated airplane to keep flying. The U. S. Air Force ground crews, which maintain the aircraft, say the best they can do is keep 50 to 60% of their present 16 C-119s in condition to fly tactical missions—not counting those damaged in battle.

During Dienbienphu approximately 25 aircraft were necessary in order to maintain an average of 18 missions per day.

Since Dienbienphu, C-119 operations have been cut down by direction of USAF to 12 missions per day. These are flown by the CAT pilots under CAT Inc.'s contract with the French Air Force. All missions to the interior, mainly to Seno in southern Laos are drops. Some flights toting napalm tanks from here land at the air base at Nha Trang.

▶**New Nords**—By September, the French command hopes to bring in a squadron of 20 Nord transports. One

T-34 Heads Up

USAF Beech T-34 Mentor primary trainer climbs straight up on the power of its 225 hp. Continental engine. Selected as the standard light trainer for USAF, Navy and the air arms of Canada, Chile, Colombia, El Salvador and the National Safety Forces of Japan, the T-34 has won every evaluation contest in which it has participated, according to Beech Aircraft Corp., Wichita, Kan.

has been flown around Indo-China on demonstration flights.

This French-built aircraft has trim, clean lines. Its payload of four-and-a-half tons is less than the C-119, but the French claim it has the desirable characteristic of being able to land at all air strips in the country. It has the same type of air dropping equipment as the Boxcar.

A second squadron has been scheduled for the end of the year.

In the meantime, the French hope to keep the Boxcars and would like to have the present limit of 12 missions per day raised. As real fight develops for the Red River delta city of Hanoi in north Vietnam, a new heavy airlift is becoming necessary.

▶ **FAF Weakness**—The French Air Force efforts to suppress the Communist flak batteries were considered so inadequate by the CAT pilots that they requested permission to handle it themselves. All they wanted were four or five fighters and a couple of B-26s to fly with their Boxcar airtrain. This request was turned down by the French command.

Considering the limited number of aircraft that they had available it perhaps was impossible for the French Air Force and the French fleet air arm adequately to have suppressed the Red guns. But little was done with what they had.

As USAF discovered in Korea, effective flak suppression requires a high order of coordination and timing. The French Air Force, here at least, lacks the command organization required for such an effort. This also is a dive bomber mission primarily. French pilots believe they should have had something like the Banshee in order to do the job instead of piston-engined fighters and B-26s.

French air intelligence officers discount early reports that the Communist guns were radar controlled. They believe some were directed by old type sound control equipment. But if the Reds were using radar guns of the accuracy of those used by Chinese Communists in Korea it would have been impossible to drop at low level even with the C-119s except with prohibitive losses.

Also, they point out, the C-47s could not have operated at low level during the night. To throw off the sound trackers, C-47 pilots at night unsynchronized their propellers.

Murray to Test Air Communication Setup

An evaluation of international aeronautical fixed telecommunications currently is underway by a joint government industry committee that could re-

sult in the establishment of a single authority to govern the network at U. S. gateway points such as New York and San Francisco.

As presently constituted, Civil Aeronautics Administration and Aeronautical Radio, Inc., a private agency, both operate facilities at some of these points—resulting in duplication of services.

▶ **'Guinea Pig' Test**—Effort is being made by the committee, organized under Commerce Undersecretary for Transportation Robert B. Murray, to establish an authority that could designate which of the present agencies could serve the needs of operators most and economically efficiently.

New York's port has been chosen as the "guinea pig" in the evaluation, because it is best representative of the problem. Two of the world's major international airlines (Pan American World Airways and Trans World Airlines), in addition to most of the foreign airlines, serve New York. Considerable military traffic also is handled.

▶ **Considerable Savings**—In New York, Miami and San Francisco, CAA and Arinc operate their own fixed circuits for aeronautical communication. By combining these into a single agency to serve the airline industry and the military, there would be considerable savings both in money and in frequencies used.

At New York, where the first evaluation is being made, Arinc has been determining what it would cost to extend its facilities in order to augment CAA's present facilities there. CAA is following the same procedure.

When both are sufficiently evaluated, the committee will determine which agency could most economically provide the necessary service.

▶ **Common Policy**—Arinc is the only aeronautical telecommunications agency licensed by the Federal Communications Commission outside the government. Its subscribers and members include all of U. S. scheduled airlines and various other air carriers and aircraft operators.

Object is to establish an aeronautical fixed telecommunications network with a common policy and with a single agency operating one specific telecommunications station. Result could be that one station would be operated by private industry, another by the government.

Members of the joint government industry committee include CAA Administrator Fred B. Lee, chairman; Oscar Bakke, chief of the Air Carrier Division of Civil Aeronautics Board's Bureau of Safety Regulation, J. S. Anderson, president of Arinc, E. W. Ringo, representing Transocean Airlines and Seaboard & Western Airlines, Paul Goldsboro, TWA; Capt. Waldo Lynch, PAA, and Air Transport Assn.

BEFORE CRASH on impacting apparatus, jointed lifelike dummy sits erect in NACA experimental seat, a cushioned unit embodying elasticity, frictional damping

AFTER CRASH, seat is shown deformed, with dummy tilted forward, protectively cradled in pocket formed by seat back. Design eliminates injury from metal parts

NACA Tests Promise Safer Seat Design

Experimental configuration shows how to absorb heavy impact loads and provide protective pocket that cradles passenger in a crash.

By Irving Stone

Cleveland—Recent National Advisory Committee for Aeronautics' experiments with a new seat design point the way to improved passenger safety in military and commercial aircraft.

Researchers at NACA's Lewis Flight Propulsion Laboratory have developed an experimental seat configuration whose cushioning members absorb impact loads in a crash landing and which flexes to form a pocket cradling the passenger for protection.

▶**Bring 'Em Back Alive**—The seat studies, a natural outgrowth of NACA's crash fire work, are constructive—intention is to find out how to keep the passenger alive, rather than just determine what injures or kills him.

Final evaluation of NACA's seat studies will involve performance of the experimentally developed units under full-scale crash conditions. NACA already has set aside some service weary aircraft for installation of these seats for full-scale proving.

▶**Ground Work Only**—The experimental seats used in the studies are not considered suitable for aircraft applications, because they incorporate features of construction that are necessary for research but might interfere with passenger comfort.

NACA researchers are not interested in developing the seat as a marketable item. Their aim merely is to point the way to a new approach for airlines or manufacturers to pursue farther. This means that NACA will have to allow enough latitude for the seat engineer to incorporate the desired standards of comfort.

▶**Benefits Seen**—Meanwhile the following advantages are seen for the NACA-developed seat configuration:

- **In addition to commercial** applications use on military planes such as assault craft is seen as particularly feasible. For this type of aircraft, landings are usually rough, because they are made on poorly prepared runways.
- **Increased number** of attachment points connecting new seats to floor structure decreases possibility of seat tearing loose in a crash landing. The number of connection points on the pedestal of the new seat is far greater than conventional seat's four point attachment.
- **Weight** probably will be kept within the limits established for conventional seats.
- **Cost** probably will not exceed that for a conventional unit because of the relatively inexpensive materials involved.

▶**Safety in Seats**—Aeromedical research has established that a person can withstand very high impact loads if their duration is short. Also, analysis of no fire crash landing accidents reveals that those passengers who are retained in their seats suffer the lowest percentage of severe and fatal injuries.

This information suggested to NACA researchers the possibility of learning how to reduce frequency and severity of injuries in this type of accident. In the aircraft used in NACA's crash fire program, researchers installed special instrumentation to gather data on forces transmitted through the airframe to the passenger cabin.

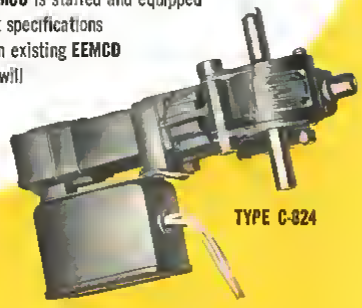
In one test it was found that loads of more than 12G were imposed. For a 200-lb. passenger this would mean a force of more than 2,400 lb. on his seat belt. Such a load might break the passenger free from his seat attachments or tear the seat from its attachment to the structure. Either situation is likely to bring injury to the passenger.

▶**Lifelike Dummies**—In other crash tests conducted by NACA, lightplanes carrying dummies were used. Supplied by the military, these dummies have bone stiffness, joint action and tissue texture similar to humans. Data of loads during crashes were obtained and slow motion pictures showed dummy reactions.

The sequences showed that a front-

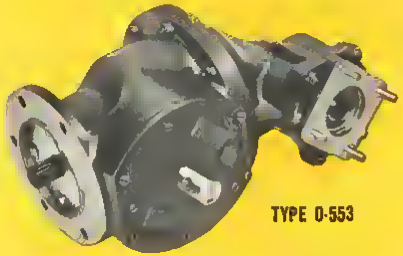
MANY PURPOSE
ROTARY ACTUATORS

EEMCO has developed many types of rotary actuators for leading air frame manufacturers for use in the newest jet aircraft and commercial airliners. The models shown here are typical of the many varied designs that have been produced for a wide variety of uses. This manufacturing experience is evidence that **EEMCO** is staffed and equipped to develop any type of actuator, rotary or linear, to **your** exact specifications designed to draw power from any source. In many cases an existing **EEMCO** model can be adapted to your specifications which will speed delivery time considerably.



TYPE C-824

Type C-824 EEMCO reversible actuator was developed for opening and closing an aircraft canopy. It develops 150 inch-pounds of torque at 81 R.P.M. in intermittent duty, utilizing 26 volts DC. Gear ratio is 141 to 1. Weight is 6¼ lbs., including radio noise filter.

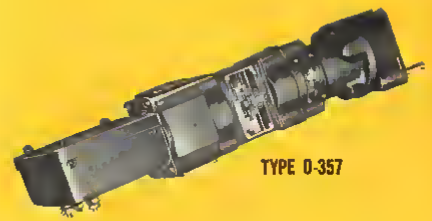


TYPE D-553

Type D-553 Vericam actuator, developed for use on Lockheed P2V, is hydraulically operated. Designed for continuous duty reversible operation, it is equipped with multiple disc torque limiter and directional torque limiter on the manual operation shaft. Normal output load at 240 R.P.M. is 250 inch-pounds. Torque limiter setting is 325 inch-pounds. Weight is 12 lbs., 5 oz.

FLEXIBLE
UNIVERSAL
POWER PACKAGE
TYPE D-471

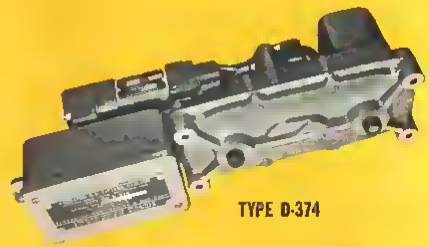
Type D-471 EEMCO rotary power package combines in one small container: motor, radio noise filter, magnetic clutch and brake, main reduction gear and auxiliary gears for driving adjustable limit switches, light switches and position indicator. It has a wide variety of possible adaptations utilizing flexible shafting to drive small rotary or linear actuators singly or in multiples. Dimensions are only 7⅛"x4⅝" x 2¾". Weight is only 3¾ lbs. Specifications may be varied to suit special requirements.



TYPE D-357

Type D-357 EEMCO-designed canopy actuator develops 50 inch-pounds at 280 R.P.M. operating on 28 volts DC in intermittant duty. Gear ratio is 40 to 1. Unit includes magnetic clutch and brake and radio noise filter. Stall torque is 300 inch pounds maximum. Weight is 4¾ lbs.

Type D-374 EEMCO camera door actuator has dual output shafts with 175° rotation at 1 second maximum. It is equipped with adjustable limit switches, radio noise filter, magnetic clutch and brake. Output is 280 inch pounds of torque on each shaft. Gear ratio is 441 to 1. Weight is 8¾ lbs.



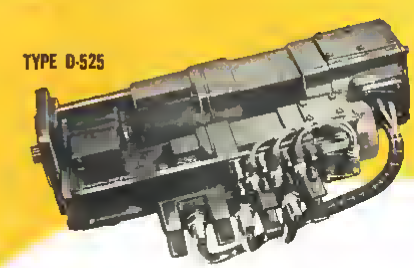
TYPE D-374

Type D-685 Designed as a trailing edge actuator for jet fighters. It has a normal peak load of 28,000 inch-pounds and a total angular travel of 30°. Speed is 675 R.P.M. with an average load of 14,000 inch pounds on a 28 volt DC system (18.75 amps). Ultimate static load is 77,000 inch-pounds. Weight is 25½ lbs. Design incorporates auxiliary power take-off and non-jamming end stops.

TYPE D-685

Type D-525 Double motor power unit for horizontal stabilizer of turboprop aircraft. Consists of small 1/15th h.p. continuous duty motor operating through a gear reduction for trimming in automatic flight, and a large intermittent duty 3½ h.p. motor with direct drive of 12,000 R.P.M. for manual operation. Dimensions of complete unit are 12½" x 7" x 3¾". Weight is 16½ lbs.

TYPE D-525



Type D-236 A rotary actuator for intermittant duty, delivering 200 inch-pounds at 107 R.P.M. on 24 volts DC. Unit includes magnetic clutch and brake, adjustable limit switch, cams, and thermal protector. Gear ratio is 28 to 1. Weight is 8½ lbs.

TYPE D-236

Designers and producers of motors,
linear and rotary actuators

Electrical Engineering and Manufacturing Corp.

4612 West Jefferson Boulevard, Los Angeles 16, California

EEMCO can supply a rotary actuator to fit *your* specifications

seat dummy struck the instrument panel with his head as the collapsing fore structure moved toward him. A dummy in the rear seat struck his head on the back of the front seat, then settled back into normal seating position. This indicated that the seats must permit a head blow without causing severe head injury.

▶ **Specs Established**—NACA's overall research findings led to establishment of design requirements for passenger seats safely to take loads imposed during a crash landing. Included in the seat specifications were provisions that the seat should be:

- **Strong enough** to hold the passenger in place.
- **Capable of enough elastic deformation** to absorb the shock of peak loads, but incorporating considerable frictional damping so as to prevent any elastic rebound.
- **Able to withstand shocks** from any direction, because a crash-landed plane may swing around and hit objects while moving sideways or rearward.
- **Constructed of such materials** so that if breakage occurs no sharp or pointed objects will endanger passenger.

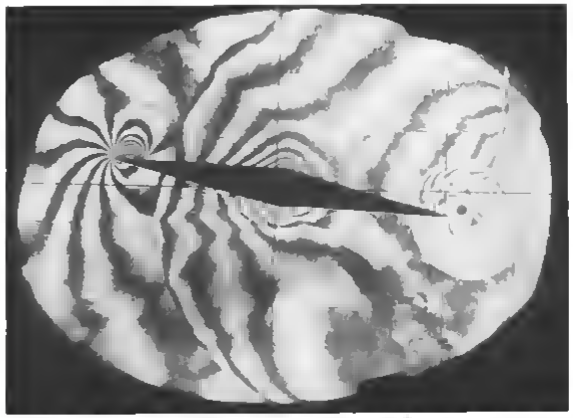
▶ **Seat Characteristics**—To determine whether these specifications could be met within the space and weight limitations required in aircraft use, an experimental seat was built for study under crash conditions. The seat incorporates these features:

- **Seat back,** side arms and seat pan are air-inflated members free from structural metal parts. A body or head blow against these parts is well cushioned. Since all members except the seat pedestal are air-inflated, the seat back and pan could in an emergency, keep the passenger afloat—possibly for a period of days.
- **Rubber linkages** between the structural members give the required elasticity and ability to support a blow from any direction.
- **Friction surfaces** between structural members which move relative to each other as the seat distorts in the crash provide the necessary damping to prevent elastic rebound.

▶ **Dummy Action**—Tests with the dummy show that if the crash blow is from the front the dummy moves forward in the seat and the seat distorts in this direction to absorb the shock of the blow.

If the crash blow comes from the rear, the dummy presses against the seat back. Under the high load against the seat back an accordion pleated rip-out panel unfolds to allow the seat back to support the dummy in the pocket formed.

If the back of the seat remained in its original (normal) position, a passenger might slip out of his seat belt and slide rearward over the seat back.



INTERFEROGRAM of flow in shock tube shows complex eddying set up by shock wave passing over double-wedge airfoil section. Flow is from left to right.

Shock Tube Used as Windtunnel

The use of a shock tube as a short duration windtunnel to study blast effects on aircraft makes up part of Project Locus, a study conducted by the Dept. of Aeronautical Engineering, Massachusetts Institute of Technology.

Usual use of the shock tube is to study the mechanics of shock waves, but Profs. R. L. Bisplinghoff and H. G. Stever believe that the MIT unit may be the only one in this country with the "windtunnel" feature.

The shock tube can simulate transient flows around aircraft up to a Mach number of about 1.5, which includes the critical transonic region. This is in addition to its primary use as a source of high-intensity shock waves for the purpose of studying blast effects.

▶**Description**—The MIT shock tube is about 98 ft. long and one foot square, made of ¾-in. steel plate. The tube is divided into two sections by a sheet of film.

One end of the shock tube is pressurized, the other end can be pumped out towards vacuum to increase the pressure ratio across the film. A remote-control knife punctures the film and the shock forms when the flow starts down the tube.

Duration of steady-state flow over the model is only about 0.040 sec., long enough to permit a series of electronically timed high-speed pictures to be taken of the flow.

Project Locus, financed by the Air Research and Development Command, USAF, is a study to determine the effects of blasts on flying aircraft, and to find out how close to a bomb blast a plane can fly without structural damage.

'Sky Compass' for Polar Navigation

A new "Sky Compass" for accurate aerial navigation in polar regions above 70 deg. latitude has been developed by the Kollsman Instrument Corp.

The Elmhurst, N. Y. manufacturer says the Sky Compass determines an aircraft's true heading by finding the position of the sun when it is below the horizon. It does this by using the polarized light in the sky when the sun is not visible. This is particularly important in the far north and south regions because of the protracted twilight periods when the sun is below the horizon. Twilight also obscures planes and starts normally used as visual references in celestial navigation.

The Sky Compass includes a specially designed optical system which incorporates an analyzer. This component includes a polarizing plate and a half-wave plate. The latter has cut outs to produce a pattern visible in the optical field. The instrument also has an illuminated bubble and a true heading objective.

The compass is periscopic in design, very similar in appearance to the periscopic sextant which Kollsman has produced for several years for the world's airlines and the military.

Advantage of the periscopic design is

ARCTIC NAVIGATION AID tells direction by polarization of sun's light

that only a very small part of the instrument protrudes into the airstream, causing practically no additional drag, Kollsman says. Also, the danger of blown out astrodomes is avoided, it is claimed.

To operate, the navigator rotates the Sky Compass as he looks through the eyepiece. The light intensity in the various portions of the pattern in the analyzer varies until the Sky Compass is pointed towards the sun's azimuth. When this happens, the pattern disappears and the optical field becomes a solid grey—a condition known as the "match point." Then the navigator reads the aircraft's true heading from the scale.

Kollsman says that an advantage of the Sky Compass is that the analyzer pattern, bubble image and true heading scale are all visible in the optical field. This enables the navigator to check all three simultaneously and get his true heading quickly and accurately.

Hiller Erects Barrier For Jet Test Noise

The jet engine whirl-test stand at Hiller Helicopters, Palo Alto, Calif., is shrouded with a large sound barrier and muffler system to maintain a low noise level during test runs.

Standing about 18 ft. high and with a diameter of about 40 ft., the insulated structure was designed by Hiller's industrial engineering personnel in conjunction with Owens Corning's Fiberglas Division sound control engineers. It was constructed by Aro & Oberman, Palo Alto.

Lower half of the wall is comprised of two wood sides with 3 ft. of dirt fill between. Upper portion of the barrier, also a double wall, has a Fiberglas blanket as the insulating material.

Because of the technical problems

SOUND BARRIER for Hiller test stand.

concerned with the intake of air for the jets, it was not feasible to build a completely enclosed circular barrier, it is reported, hence the barrier was positioned to provide shielding for the populated areas, with the open end pointed toward San Francisco Bay.

THRUST & DRAG

Eighty books from the "Reading List for Young Engineers" have been placed for loan to the headquarters building of all engineering society activity in the Cincinnati area. This is a part of a pilot study program to determine what aspects of community life can be of assistance to young engineers during the first few years following graduation.

The books cover almost any subject in the arts and humanities, they include Balzac's "Droll Stories" and Marx's "Capital" and Twain's "Tom Sawyer."

This is a commendable step in the liberal education of an engineer and it has only one disturbing aspect: the fact that it was necessary in the first place.

Why should an engineer have to be urged to improve his humanistic background? Why must a committee have to recommend the books he should read? Why have the engineering schools missed the boat so completely in teaching more than engineering?

* * *

McDonnell Aircraft Corp.'s John H. Meyer, chief of structures, airplane branch, said this about weight saving at the recent summer meeting of the Institute of the Aeronautical Sciences:

"At McDonnell we have come to the conclusion that weight saving is quite important to fighter airplanes, and have established a criterion for its importance as follows:

(a) In engineering, we can spend up to 50 man-hours design time to save a pound on a given design, all other things being equal.

(b) In manufacturing, we can spend up to 10 man hours per pound for each airplane, all other things being equal."

* * *

Let's nominate for oblivion a dog-eared old cliche from the engineering presentation. Let's sell Topsy down the river.

For years, you and I have been listening to speakers say that their organization "just growed, like Topsy." At that point, word association takes over and for the next few seconds I see the ol' plantation and the ice floes and hear the belling bloodhounds. By the time I shake off the magnolia petals, the speaker has gone on and is winding up for the finale. I've missed the in-between.

There are all sorts of better—even more colorful—phrases to describe the random growth of engineering organizations, and I for one would like to hear them, instead of the bloodhounds and the churning river. —DAA

AVIATION WEEK *presents the*

AUGUST 16, 1954

THE *complete story of AIR FORCE PROCUREMENT* AIR MATERIEL COMMAND EDITION

WORKING WITH the editorial cooperation of the USAF Air Materiel Command, Aviation Week's editors are preparing their most important publishing assignment of the year . . . the August 16 Air Materiel Command Edition. Editorial offices at Wright-Patterson Air Force Base, Dayton, Ohio are humming with activity as teams of Aviation Week editors collect the latest available information and data on 1955 Air Force Procurement and weave together the complete story of this major Air Force Command.

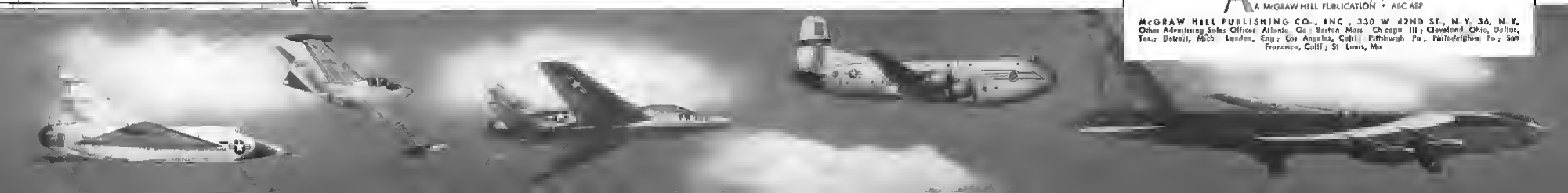
KEY EDITORIAL EFFORT is being concentrated on covering new policies and ground rules of AMC and its revised relations with the aircraft industry . . . spelling out new regulations and complete information on how to best do business with the government. Other editorial sections will be devoted to Air Force industrial mobilization plans, spares provisioning policy, and industry's new role in Maintenance and overhaul programs. Research and Development procurement will be featured in a special report.

COMPLETE DETAILS on Fiscal 1955's Air Force Procurement Program as well as complete Command organization data and buying information will establish the unmatched usefulness of this Air Materiel Command edition in the Aviation Industry, the Air Force and the Government. In addition, this issue will provide a valuable tool in the government's everlasting search for new sources of manufactured products, materials and services.

CURRENTLY, AMC holds over $16 billion in contracts awarded. More than 14,000 different firms are AMC prime contractors, and AMC inventories list more than 1,250,000 separate items. Approximately 100,000 AMC employees transact this huge business volume, with civilian employment far outnumbering military. AMC expends more dollars annually than General Motors, Standard Oil of New Jersey, American Telephone and Telegraph, Ford, Bethlehem Steel, General Electric, Union Carbide, Chrysler, Westinghouse, U. S. Steel and duPont combined . . . provides aircraft and equipment maintenance on a scale ten times larger than all domestic airlines combined.

MORE THAN 50,000 ENGINEERS, aviation management men, Air Force, Military and Government Officials will have a copy of this issue on August 16, 1954. Make sure your company is represented in the Air Materiel Command Edition. Write—or wire—your advertising reservation to:

BUSINESS MANAGER, AVIATION WEEK,
330 WEST 42ND STREET, NEW YORK 36, N. Y.



New Inventions

Government Offers Patents for License

New patents issued recently on inventions assigned to the U S in the field of aircraft and parts have been reported to AVIATION WEEK by the Government Patents Board

They are listed below in a reader service that will appear as the Board provides the abstracts

These inventions are available for license, ordinarily on a non-exclusive, royalty-free basis, on application to the agency indicated in the abstract Printed copies of letters patent may be obtained from the Commissioner of Patents, Washington 25, D C, at 25 cents a copy, payable by check or money order Specify by title and patent number when ordering

▶**DIFFUSER APPARATUS WITH BOUNDARY LAYER CONTROL** Patent No 2,674,845 issued Apr 13, 1954

An exhaust gas diffuser for a jet motor comprises a hollow fairing cone supported on hollow struts radially disposed within an outer cylinder wall and positioned in the afterburner section of the motor The cone has boundary layer air bleed apertures which communicate through the fairings with discharge outlets formed in the struts so that the air may be returned to the main body of motive gases at a point remote from the critical flow surfaces of the cone Inventor Walter D Ponchot Administered by the Patent Counsel Department of the Navy, Washington 25, D C

▶**ROCKET PROPULSION UNIT WITHOUT SEPARATE GAS GENERATOR FOR TURBOPUMPS** Patent No 2,676,456, issued Apr 27, 1954

A pump assembly for a rocket propulsion unit comprises a pump having turbine blades and means to drive the blades by the gases from the main rocket chamber of the rocket motor, the gases passing into and through the mixing chamber before reaching the pump turbine The mixing chamber is connected to the delivery side of at least one pump to deliver at least one of the liquid propellants from the pumps into the mixing chambers to reduce the gas temperature therein Inventor Hans T Holzwarth Administered by the Chief Patents Branch Office of the Judge Advocate General, Department of the Air Force, Washington 25

▶**COMBINED ROCKET AND JET PROPULSION** Patent No 2,676,457, issued Apr 27, 1954

A combined rocket and jet propulsion motor for aircraft comprises a gas turbine having an annular jet nozzle the inner wall of which is defined by a conical tailpiece A rocket motor is positioned within the conical tailpiece and so arranged as to discharge its jet through an opening provided at the apex of the tailpiece Air from the intake passes through a compressor and then into a combustion chamber, and the hot gases are then directed by guide vanes against the blades of a turbine disc The exhaust gases flow over the tailpiece and join the jet discharged from the rocket unit Inventor Fred S Kramer Administered by the Patent Counsel Department of the Navy, Washington 25, D C

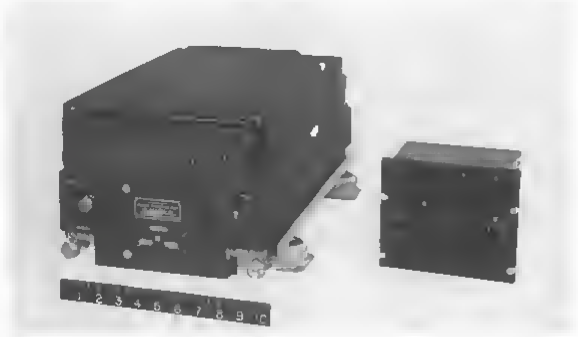
▶**CORROSION RESISTING COATING** Patent No 2,676,942 issued Apr 27, 1954

A corrosion resisting coating for metal such as aircraft control cables, comprises a mixture of vinylmethacrylate resins in low boiling solvents, a plasticizer and a corrosion inhibitor A typical composition comprises by weight 100 parts of a copolymer of vinyl chloride, vinyl acetate and maleic acid, 40 parts N butyl methacrylate polymer, 33 parts of polyethylene glycol di 2 ethyl-hexoate as a plasticizer, 5 parts zinc potassium basic chromate dissolved in a mixture of xylol, toluol and methyl isobutyl ketone Inventor Alfred L Glass Administered by the Patent Counsel Department of the Navy Washington 25 D C

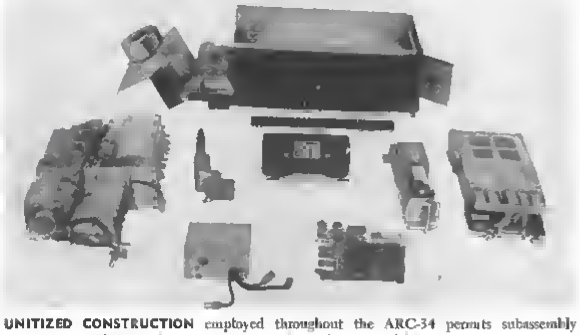
▶**FLIGHT TRAINER**, Patent No 2,671,970, issued Mar 16, 1954

A flight trainer for aircraft pilots comprises an index representing a model aircraft, a model maneuver area translatable in respect to the index, a trainee's station having simulated aircraft controls for causing motion of the maneuver area to simulate an aircraft flying in the area and an optical system to permit the trainee to view the area from the index Inventor Otto H Schmitt, Administered by Patent Counsel, Department of the Navy Washington 25

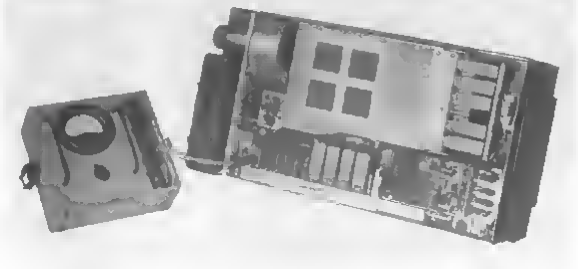
New UHF Transceiver Ideas Pay Off



NEW 1,750-CHANNEL UHF TRANSCEIVER developed by RCA, to be standard equipment on all new USAF aircraft, is 40% lighter, 50% smaller than predecessor



UNITIZED CONSTRUCTION employed throughout the ARC-34 permits subassembly replacement without tuning or alignment, using only a screwdriver.



FAULT-FINDING TESTER ISOLATES TROUBLE to major subassembly by providing convenient means of measuring significant voltage and currents

• AF finds maintenance problems reduced by field test of pilot quantities, simplified design.

By Philip Klass

Dayton—First report on Air Force's new UHF transceiver, the AN/ARC 34, indicates that pre production field testing of pilot quantities, use of unitized construction, and built-in fault-isolating provisions have paid off in reduced maintenance time, cost, and less skill required of GI maintenance personnel.

USAF's experience shows "Lowest echelon maintenance personnel . . . who normally check plugs and tubes, could do the next higher echelon maintenance (on the ARC-34) and, in some cases with a little help, the very highest echelon of maintenance," despite the fact that the ARC-34 was new and unfamiliar equipment. This was reported by C. H. Scheer, a branch chief in the Wright Air Development Center's Communications & Navigation Lab, to the recent airborne electronics meeting at Dayton.

▶**Developed by RCA**—The new ARC 34 developed by Radio Corp. of America, is a 1,750-channel, remotely controlled command communications set covering the 225-to-400-mc band. Any 20 of its 1,750 frequencies can be preset and selected in flight from a single knob. The set weighs 53 lb (including remote tuning control), and occupies a volume of one cubic foot. This is approximately 40% lighter and 50% smaller than previous UHF transceivers, Scheer says.

The older Collins AN/ARC 27 UHF transceiver developed by the Navy and used until recently by both services is mounted in a pressurized container for high altitude operation. This imposes some size and weight penalty. The ARC-34, while not pressurized, can deliver full power up to 50,000 ft., RCA says.)

▶**How It Was Achieved**—The notable record of the ARC-34, Scheer said, is the result of a new production philosophy and two engineering philosophies employed in its design.

• **Pre-production field test,** under operational conditions of pilot quantities built with production tooling.

• **Unitized construction throughout,** with each subassembly designed to permit replacement without any adjustments and without sacrificing overall equipment performance.

• **Fault isolating provisions,** including a simple "go, no-go" tester which can be plugged in to locate faulty subassemblies.

▶**Most Significant**—Possibly the most significant innovation was the decision to produce 150 pre-production ARC-34s with production tooling prior to plunging into a full scale manufacturing program. The entire batch of ARC-34s was installed on jet fighters at a single eastern air base where WADC and RCA engineers could keep close watch on performance and shortcomings.

This controlled field test was the first of its kind ever attempted by the C&N lab and may possibly have been the first ever attempted by any WADC lab, Scheer told AVIATION WEEK. This experiment "proved that there is no substitute for proving out a new equipment in the environment in which it will be used by many different pilots, in many airplanes," Scheer said.

▶**Design Changes Easier**—Development samples, which are subjected to extensive bench and flight testing, are seldom just like the article which will be produced in quantity, Scheer pointed out. Design changes suggested by field or manufacturing experience are difficult to introduce if full-scale production is underway, involving extensive backfit modification programs and disrupting manufacturing operations.

The ARC-34 controlled field test "has proven its value in terms of the design changes which have resulted to date," Scheer said. "Some actually would have required rework in the field. Others represent improved manufacturing methods and techniques. All of them will represent very significant savings to the military services over and above the cost of this first production," Scheer added.

This has prompted other WADC labs to follow suit on new complex equipments which they are readying for production, Scheer said. He believes the technique should be employed whenever the time schedule will permit it.

▶**Added Unitization Hurdles**—To take fullest advantage of unitized-type construction, not in itself new, the C&N lab imposed some added requirements in the ARC-34. Each major assembly had to be designed so it could be plugged in as a replacement without any adjustments, and this should not affect equipment performance adversely. For instance, each intermediate frequency amplifier stage is a completely self-contained, pre-tuned, plug-in unit, eliminating alignment problems.

Each major assembly had to be removable with only a screwdriver. Gears, splines and mechanical couplings had to be designed so as not to require any special positioning, other than to engage them.

▶**Fault Isolation**—RCA designed each major subassembly so that a tester could be plugged in for speedy checking of vertical voltages and currents, selected by the rotary switch on the tester. Limiting values for each check are posted on a chart in the tester cover. As a result, "a person with practically no training can immediately determine the faulty subassembly," Scheer said.

One penalty of unitized construction, inaccessibility of individual components, is overcome by patch cables which RCA supplies. These allow subassemblies to be pulled out, yet electrically connected to the main chassis and operated for high echelon trouble-shooting.

▶**Answer to Growing Complexity**—Scheer is hopeful that the approach used in the ARC-34 program is at least a partial answer to the problem of growing complexity in military communications equipment. One example of this growing complexity: World War II AN/ARC-1 communications set had only 10 channels; ARC-34 has 1,750, which requires complex frequency synthesizer circuitry.

The greater the complexity, the higher the skill required for maintenance, the greater the cost of maintenance training, and the fewer the qualified personnel available to do the maintenance, is the way Scheer sums up the problem.

Maintenance costs have reached the point, Scheer said, where the military spends eight to 10 times the original cost of an equipment to keep it operating during its lifetime.

▶**New USAF Standard**—The ARC-34 is slated to become the standard UHF equipment on all new USAF aircraft, and may be used to replace the ARC-27 on existing fighters and interceptors where space and weight are a critical problem.

Following are a few of the technical highlights of the ARC-34, based on data released by RCA:

• **Channel spacing:** 100 kc.
• **Channel stability:** 10 kc.
• **Power output:** 8 watts minimum.
• **Approximate range:** Up to 250 miles air-to-ground, up to 550 miles when used air-to-air.
• **Receiver sensitivity:** 5 microvolts or better with 10-db signal-plus-noise to noise ratio produces output of 0.8 volts or better across 150-ohm load.
• **Channel selection time:** No more than 4 sec.

The ARC-34 has a separate guard channel for transmission and reception of emergency messages. Guard channel receiver has its own RF and IF sections, but shares the audio amplifier of the main receiver.

TOMORROW'S AIRCRAFT: *One step closer*

Air Arm Systems "package engineered" for installation and maintenance

Quicker installation and easier maintenance . . . important plus-features for airborne electronics equipment are a reality at Air Arm. The basic Air Arm approach to *all* electronic problems, combined with inherent ingenuity and capability, has led to concepts such as pallet packaging, encapsulated and functional circuitry, built-in test points . . . to mention just a few.

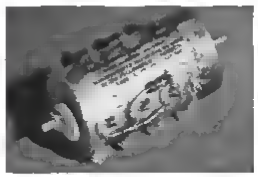
Applying these concepts to all Air Arm systems gives outstanding features . . .

- 100% accessibility
- compatibility with aerodynamic design
- weight and space reduction
- self-contained shock isolation
- simplified airframe design and construction

MAGAMPS, potted units and other proven developments for weight and size reduction are a basic part of the new packaging concepts. Electronic circuits are physically combined and integrated into compact subassemblies—each of which has a single major function. Thus, over-all packages are made up of functional units of complete systems.

This "package-engineering" results from intense Air Arm development and close Air Arm association with the special problems of airframe design and operational requirements. Such achievements in electronic-mechanical design are typical of Air Arm's efforts to bring simplicity and increased reliability into airborne systems, thus bringing tomorrow's aircraft—One Step Closer. Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-91019



MAGAMPS typify the "package-engineering" which Air Arm applies to airborne systems. Simple and reliable as iron and copper, they are a rugged replacement for vacuum tubes. Wherever such packaging is used, maintenance is reduced, circuitry is simplified and systems are far more dependable.

The most advanced state-of-the-art is always brought to bear in Westinghouse design, evaluation and improvement of airborne systems. For example, human engineering studies help technicians perform tasks quickly, simply and surely—thus building the greatest amount of dependability into the system.

Jet Propulsion • Airborne Electronics • Aircraft Electrical Systems and Motors • Wind Tunnels to Plastics

YOU CAN BE SURE...IF IT'S

Westinghouse

Makers Report New Measurement Devices

A new vacuum tube voltmeter, designed for use over a frequency range of 10 cps to 4 mc, is one of several recently announced voltage and phase measuring devices suitable for laboratory use. The new Model 400D can measure voltages of 0.1 mv to 300 v in 12 selectable ranges, is reportedly accurate to within 2% up to 1 mc. Input impedance is 10 megohms. Manufacturer is Hewlett Packard Co., Dept. P, 395 Page Mill Road, Palo Alto, Calif.

Other new measurement devices

• **Low frequency phase meter,** covering range of 0.0001 cps to 1,000 cps, can reportedly measure phase between two voltages to within 0.5 degree, gives a digital type readout on five decade counters. Manufacturer Advance Electronics Co., 451 Highland Ave., Passaic, N. J.

• **Vacuum-tube electrometer,** Model 210, a d-c voltmeter with input impedance greater than 10^{14}, grid current below 10^{-15}, and drift within 10 mv/hour, according to Keithley Instruments Co. Unit has five voltage ranges: zero to 0.8, 2, 8, 20, and 80 volts, either polarity. New meter also can function as a d-c preamplifier for recorders and oscilloscopes with quoted frequency response of 0 to 5,000 cps. Company address: 3868 Carnegie Ave., Cleveland 15, Ohio.

• **Phase meter,** Type 322-A, measures phase angle to within one degree, or changes in phase angle to within 0.1% over frequency range of 20 to 20,000 cps, or up to 1 mc with slightly higher errors. Input signal range is 2.30 v. Technology Instrument Corp., Acton, Mass.

Avionic Literature

Recently announced bulletins and data sheets describing devices and techniques of interest to persons in the avionics field include:

• **Germanium diodes.** Type 1N-2 page catalog and data sheet. Bulletin N-1. International Resistance Co., 401 N. Broad St., Philadelphia 8, Pa.

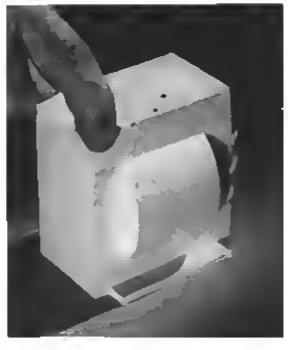
• **Printed circuit production problems** and techniques. Bulletin 106. 4 pages. Insulated Circuits, Inc., 115 Roosevelt Ave., Bellaville, N. J.

• **VOR (omnirange) systems.** both 50 watt and 200 watt. Including technical specs. (12 pp.) Collins Radio Co., Cedar Rapids, Iowa.

• **Circuit breaker engineering guide.** 24-pages describes their application. Heinemann Electric Co., 278 Plum St., Trenton 2, N. J.

• **High-frequency resistors.** Type MP. application data on 43 types. Bulletin F-1 (8 pp.) International Resistance Co., 401 N. Broad St., Philadelphia 8, Pa.

• **Precision test instruments,** including recording oscillographs, galvanometers, amplifiers, analog computers, function generators. (4 pp.) Wm. Miller Instruments, Inc., 325 N. Halstead Ave., Pasadena 8, Calif.



Dielectric Jacket

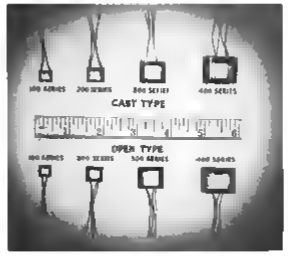
This transformer is coated with Silastic S-2007, new resilient encapsulating material. Designed for avionic components, Silastic S-2007 reportedly has twice the thermal conductivity of conventional resinous or rubber dielectrics, according to Dow Corning Corp. Transformers coated with S-2007 meet moisture resistance and low temperature flexibility specs of MIL-T-27, Grade 1. It cures in 2-4 hours at 200C.

FILTER CENTER

▶**New Pioneer Autopilot for YC-133**—Eclipse Pioneer's new PB 20 autopilot, an advanced design for high-speed aircraft (AVIATION WEEK Dec. 28, 1953, p. 11), is slated for the Douglas YC-133 turboprop. Company says this is the first USAF equipment contract awarded under the modified weapons system procedure which enables equipment and aircraft manufacturers to work directly with each other, with AF acting as monitor, to provide more flexibility during pre-production phase of the program.

▶**New Gyro Proves Out**—Summers Gyro reports that its new PAR (position and rate) gyro has successfully stabilized a Radioplane KD2R-3 target drone at Pt. Mugu, Calif., Naval Air Missile Test Center. Summers says it initiated the test to answer skepticism in some quarters about the new device, which consists of a rate gyro and an integrating motor. (AVIATION WEEK Dec. 14, 1953, p. 71)

▶**Zeroing Aircraft Charge**—A system for maintaining zero (or an arbitrary value) electrostatic charge on an aircraft in flight has been developed and tested by Cornell Aeronautical Lab., under contract to Air Force Cambridge Research Center. The system, described by CAL's Frank M. Pelton at the recent Dayton avionics conference, consists of two electrostatic field sensing elements in the wing tips, a discharging point in the tail and a variable high voltage supply to activate discharge.



Tiny Transformers

Tiny transformers for transistor circuits, encapsulated or open, are available in four types (input, output, interstage or chokes), rated from under one milliwatt to over 100 mw. All models are rated for operation in temperature range of —25C to 100C. Manufacturer is Texas Instruments Inc., 6000 Lemmon Ave., Dallas 9, Tex.

▶**New Marker Beacon Report**—'Minimum Performance Standards (for) Airborne Radio Marker Receiving Equipment Operation on 75 Mc.' is the title of new report by Radio Technical Commission for Aeronautics Special Committee No. 58. Identified as Paper 97-54/DO-57, report can be obtained for 30 cents from RTCA Secretariat, 1724 "F" St. N.W., Washington 25, D. C.

▶**Ryan Active In Avionics**—Growing activity of Ryan Aeronautical Co. in the avionics field is shown in company's report that it is manufacturing limited quantities of an airborne navigational system for Navy and is developing guidance systems for USAF. Ryan also makes the avionic equipment for its Firebee target drone and recently obtained a BuAer contract to develop an airborne helicopter hovering device. (AVIATION WEEK June 7, p. 7)

▶**Gremlins Get ECA?**—In our article, "Transport Copters Need New Nav Aids" (July 12, p. 48), printers' gremlins dropped the word 'No' from a sentence, making it appear that GCA equipped with MTI has difficulty "seeing" a hovering helicopter. The reverse is true, of course, as the equipment filters out ground clutter and picks up the copter's rotating blades. —PK

'Flying Showcase' Sells Bendix Products

REFURBISHED DOUGLAS DC 3 is inflight demonstrator for Bendix Aviation products.

DISPLAY COUNTERS behind cockpit are 13 ft. long. Power outlets are provided so exhibits can be operated wherever feasible. Products are changed for specific audiences

Miami—On a flight down here from Teterboro, Bendix Aviation Corp. showed this writer its "Flying Showcase," an ex-UAL DC-3 that the company uses to display its airborne wares.

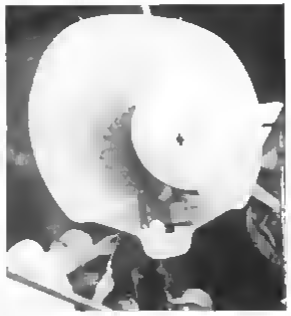
The Bendix RDR-1 airborne radar was in full operation during the flight. The thunderstorms forecast for the Jacksonville-Daytona, Fla., area did not materialize, so there was no opportunity to demonstrate the equipment's weather warning ability. However, in its second job—terrain mapping—it did a fine job showing rivers and coastline clearly on the long-persistence cathode ray tube. The RDR's antenna is mounted in the nose in a radio transparent, optically opaque radome. It scans the area in front of the plane at a rate of 15 rmp. The set incorporates three sweep ranges—20, 50 and 150 mi.

A hood that snaps on the front of the scope protects it from bright sunlight. The scope is ceiling-mounted on a swivel so it can be turned easily for use by either pilot, the flight engineer or an observer.

A servo motor tilts the antenna through a range of plus 15 deg. to minus 15 deg. The antenna is stabilized against pitch and roll of the aircraft to a maximum of 20 deg. Angular displacement information is taken from the plane's autopilot, or, when no autopilot is aboard, from a separate gyro.

Other equipment on display in the Flying Showcase:

• Course-line computer, installed the evening before this flight. This laboratory new computer "makes an omni station out of any desired point on the map," say Eclipse-Pioneer personnel.



ANTENNA for RDR-1 airborne radar was installed by Reinmert-Werner employes.

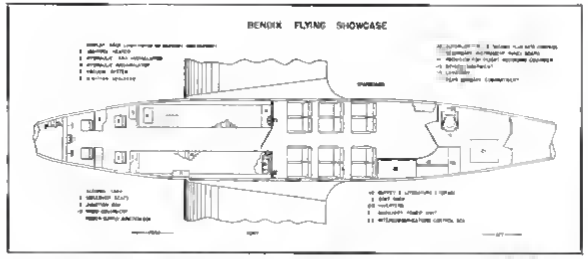


DIAGRAM shows layout of DC-3 used to display products of various Bendix divisions

AFT PASSENGER CABIN for 12 includes demonstration flight panel on starboard side

RDR-1 AIRBORNE RADAR system indicator is mounted on swivel in Flying Showcase for use by either pilot or co-pilot. Second indicator is located in passenger cabin

who developed it When bearing information and distance, to destination that is offset from an omni DME station are set into the computer, it will establish the acquired track to the destination The computer turns the new destination into a reference station and the bearing to the station can be read from the radio magnetic indicator Deviation from the desired course can be read on the usual crosspointer indicator or Ourmimag The compufer is not yet an production but is scheduled for early availability

• **Remote-reading directional gyro indicator** for executive aircraft Instrument incorporates the same low drift gyro used in Bendix's Polar Path compass system It is claimed to give business and aircraft operators the same accuracies heretofore available only in military and commercial airline equipment The system uses an autosyn synchro takeoff on the gyro to drive the panel mounted indicator The indicator also mounts an autosyn takeoff, so it may drive still other instruments

• **Resin impregnated Fiberglas bottles** for liquid oxygen, such as Bendix is providing for the Republic F 84F, Boeing B 47 and B 52 and Douglas B-66 The bottles contain liquid oxygen at —290f ; the company points out that 1 cu in of the liquid is equivalent to 800 cu in of oxygen in the gaseous state

• **PB 10A autopilot** and automatic approach flight path control

• **Scintilla ignition analyzer.**

• **Engine instruments**

• **Navigational and communications equipment**

• **Overvoltage fault protection system.**

• **Gravimetric type fuel flow system.**

▶ **Show Room**—The forward section of the cabin contains two 13 ft counters on which the products—most of them hooked up—are displayed Then comes a bulkhead, aft of which is a 12 seat cabin with a flight panel, so passengers may observe performance —GLC

Trailer Classrooms Have Push-Out Walls

Navy is using a fleet of novel mobile classrooms with walls that can be cranked out to expand from the trailers normal traveling width of 8 ft to form sidewalls of a room 20 ft. square. Up to 40 trainees can be seated comfortably in the new traveling classrooms

The units were designed and built by Trailmobile, Inc , Cincinnati, to answer the Navy's need for a unit that could provide small auxiliary naval air training bases the same technical training advantages enjoyed previously only by larger stations

They are used to teach munitions ordnance and re-arming phases of aviation The courses cover administrative ordnance, aircraft guns and accessories, ordnance electricity, fire control equipment, turrets, releasing and launching of related equipment

OFF THE LINE

Self-sealing, magnetic drain plug assembly, made by Technical Development Co , Philadelphia, is now being handled

by Air Associates, Inc , as exclusive distributor The plug has a spring-loaded poppet-type valve which seals off the sump when the plug is removed for inspection

Lydda workshops of El Al, Israel National Airlines, will be taken over by Berick Corp , a $3 million aviation repair base owned jointly by the Israeli government and a group of Americans

Wright Uses X-Ray for Alloy Studies

● Fluorescence technique slashes time needed for quality control analysis of aviation metals.

Curtiss-Wright Corp reports that chemical analysis of aviation alloys is accomplished much more speedily by complementing the usual wet chemical methods with non destructive instrument techniques, such as X ray fluorescence and optical spectroscopy.

A typical analysis of Nimonic 90 is now finished in 4 hr instead of 19 hr, Nimonic 80 is done in 4 hr instead of 14 The main saving comes through application of X-ray fluorescence, C-W points out

Samples of several different alloys now are analyzed by the quality control lab using this method Studies are being made to adapt many more materials to the technique

▶**How It Works**—The X-ray fluorescence method involves bombarding a sample of metal with X-rays of such wave length that a fluorescent spectrum is emitted by the sample Each wave length in the spectrum corresponds to an element in the sample, the intensity of each wave length is proportional to the amount of the element present in the alloy Intensity is measured by Geiger counter

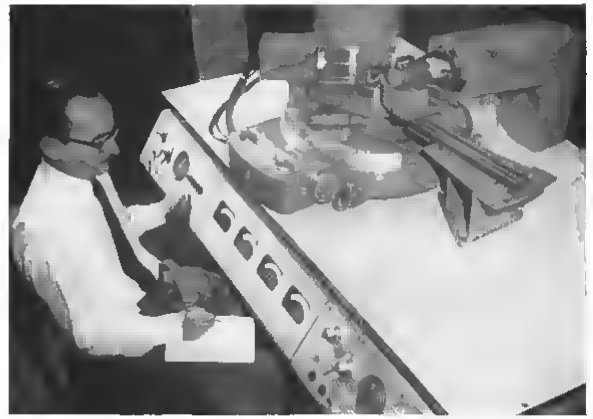
Standard calibration curves are obtained by bombarding samples of known composition that cover the concentration ranges expected in the unknowns By comparing the unknowns with standard curves, concentration may be determined with accuracy high enough for quality control purposes C-W finds that day-to-day reproducibility of results is good

▶**Limitations**—At the present time, C-W analyzes only iron, chromium and cobalt in its Nimonic 80 and 90 by means of X-ray fluorescence One reason is that the technique is effective only with elements whose atomic number is above 22 and in concentrations from 0.10% to 30%. Special helium chambers are necessary for analysis of elements whose atomic number is below 22, so optical spectroscopy is preferred in that range—the C-W lab uses optics for its aluminum and titanium. Carbon, manganese, silicon and sulfur are checked by wet chemical procedures, which are relatively simple and fast for these elements

Curtiss-Wright points out that Nimonic 80 and 90 are fairly complex alloys As a result their complete analysis encompasses the three techniques of X-ray fluorescence, optical spectroscopy and wet chemistry In the case of alloys where the X-ray technique could be used alone, the time saving afforded by the method would be especially striking, the company indicates

The equipment shown in the photos above is supplied by the General Electric Co Curtiss-Wright quality control engineers point out another maker of X-ray fluorescence units is the North American Phillips Co, located in Mt Vernon, N Y

METAL SAMPLE is readied for X-ray fluorescence analysis of makeup at Curtiss-Wright



OPERATOR READS INTENSITY of emitted wave length on dial fed by Geiger counter

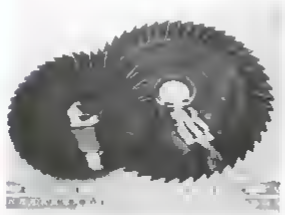
FIXTURE holds cracked milling cutter for welding. Note groove (upper right)

Welding Saves Cracked Cutters

Milling cutters, costing from $30 to several hundred dollars, are returned to operation at Temco Aircraft Corp., Dallas, the same day they are damaged. Temco uses a welding technique developed at the plant.

The rehabilitation takes a few special fixtures, welding equipment and an above-average welder.

- The pieces are lined up on a surface ground boiler plate fixture, secured with C-clamps, then tacked down in two places using a No. 680 Eutectic Welding Alloys Corp. No. 680 electrode.
- The cutter is placed on a 7x¾ in. Carborundum wheel. Here a deep groove is ground along the cracks on both sides of the cutter to give a good weld.
- The cutter is placed into another fixture made of two steel rings, cut from 10 in. od pipe, which are tightened by means of four ¼x4 in. bolts. Four smaller bolts attached to steel crosspieces in each ring are screwed tight against the cutter.



WELDED CUTTERS are ready for service after repaired areas are ground down.

- Both fixture and cutter are preheated to about 700 deg. Welding is done with the 680 electrode. Between tacks, the work is heated with a No. 7 tip on an oxygen acetylene torch. Completed welds are ground flush with the cutter surface.

The welding operation takes about one-half hour, excluding setup and preheat time.

▶ **Success Hints**—Here are some safeguards against further cracking of cutters during welding.

- Weld from the hub of the cutter to the cutting edge.
- Keep the weld balanced on both sides of the groove and maintain the arc as close as possible to the groove's center.
- Get the torch flame on the work immediately after each tack is made.
- Weld briefly at one extremity of the crack, then at the other to avoid "pull" at any one point.

USAF Contracts

Following is a list of recent USAF contracts announced by Air Materiel Command:

Jack & Heintz, Inc., Cleveland 1 control panels 2 838 ea., $810,762; 2500 VA motor generators, $1,042,761; meter generator 2 000 ea., $976,000; generators aircraft 10? ea., $114,433.

Jam Handy Organization Inc., 2821 East Grand Blvd., Detroit, motion picture project 19151 1 ea., $37,121.

Johnson Face Box Co., 4818 Ravenswood Ave., Chicago 40, Ill., changer gun 20 MM automatic 1 104, $750,154.

Kelay Manufacturing Corp., 555 Broadway, New York, N. Y., train ntraspeed amplifiers and indicators, 165 ea., 171 ea., $111,552.

Kollsman Instrument Corp., 80-08 45th Ave., Elmhurst, N. Y., altimeter pressure 302, $69,976; indicator tachometer 1,300 engineering data, not maintenence data sel, $92,418; indicator elec. tachometer 1,981 ea., $149,461.

Leac Inc., 110 Ionia Ave., N. W., Grand Rapids, Mich., odometer assy. and data, 495,666; F-1A indicators, 2,172 ea.; K-4 Control, 1070 ea., $3,010,215.

Lisco Products Co., 631 West 6th Ave., Glendale 4, Calif., film holders, 18,182 ea., $51,923.

Lockheed Aircraft Corp., Factory "A", P. O. Box 551, Burbank, Calif., S/P 808 T-33A, aircraft, $521,250.

Lockheed Aircraft Corp., Marietta, Ga., facilities, $54,670; C-130A airplanes, 20 ea., $57,200,000.

Lycoming Division, Avco Manufacturing Corp., 652 Main St., Stratford, Conn., R1820-84 spare parts for aircraft, bulk, $400,000.

Massillon-Cleveland-Akron Sign Co., Massillon, Ohio, low target, 21,488., $360,370.

Minneapolis-Honeywell Regulator Co., 2600 Ridgway Rd., Minneapolis, autopilot components E-6, $67,182.

North American Aviation Inc., Los Angeles International Airport, Los Angeles 45, F-100C aircraft, $46,324,868.

Pezhushin Aviation Corp., 6651 West Century Blvd., Los Angeles 45, tank assembly, 11,514 ea., $1,702,844.

Radioplane Co., Van Nuys, Calif., target drones, $5,427,968.

Red Bank Division, Bendix Aviation Corp., Eatontown, N. J., meter generators, $843,400.

Reynolds Metals Co., Richmond, Va., chaff, type RR/AL, 10,000 cartons, $105,340.

Royal Electric, Inc., Jamestown, Ohio, motor generators, 1,078 ea., $450,576; 895 ea., $388,605.

OVERSEAS SPOTLIGHT

Japanese Buy 2 Marathons

LONDON

The Japanese carrier, Far Eastern Airlines, took delivery of the first of two new 20-passenger Handley Page Marathons earlier this month at the British company's Reading plant. The second plane was expected to follow soon.

Fitted for FEA requirements, the four-engine transports are said to have a range of 1,330 mi. at 165 mph. Powerplants are de Havilland Gipsy Queen 70 4s, rated at 340 hp. each. Gross weight is 18,250 lb.

Heron Feederliners to India

LONDON

Indian Airlines Corp. plans to buy eight de Havilland Heron 2 feederliners soon, with the possibility of more later, the Times reports. The Heron 2s will seat 14.

In addition, the carrier is looking at transports for its longer routes between main cities. Choice will probably be either the Convair or Vickers Viscount.

Corrosion Downed Viking

JOHANNESBURG

Corrosion-triggered fatigue cracks led to fracture of a vital bolt hole in the wing of a Central African Airways Viking transport resulting in a crash that killed the eight passengers and crew of five Mar. 29, 1953.

A government board of inquiry found that a sudden gust of wind struck the aircraft, causing a fracture of the fatigue-weakened lower starboard boom outboard, which was rapidly followed by complete disintegration of the Vickers transport.

Corrosion must be attributed mainly to the fact that the steel bolt was not cadmium plated, the board stated.

Naturally, Reds Have More

LONDON

Length of Russia's internal air routes exceed that of the U. S., according to Air Marshal N. Shiriko.

Flight magazine quotes a Moscow radio broadcast in which the Red marshal also stated that during the last three years of World War II, the Reds produced 40,000 planes a year.

The marshal also added a few more claims of Russian firsts: first heavier than air flight (Mozhaisky, 1882), first outside loop (Nicolayevitch, 1913), first jet flight (by Bakhchivanzhi, in aircraft built by Bolkhovitinov, engine designed by Doushkin, 1942).

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Porous stainless steel elements in filters for airborne hydraulic service can be used in operations at over 600F.

Made of Type 316 stainless, these elements are available to remove particles in 2, 3, 7, 12 or 22 micron size. They are said to produce low pressure drop and have long service life. They are easily cleaned in the field for re-use.

Filters are presently available for handling 0.5, 3, 6 and 12 gpm., and are said to be considerably smaller than equivalent AN-6235 units.

Aircraft Porous Media, Inc., Glen Cove, N. Y.

MAGNET used with fork lift truck

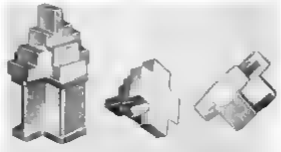
Small Electromagnets Speed Material Handling

A line of small electromagnets for use with mobile materials handling systems has been announced by the Electric Controller & Manufacturing Co. The magnets can be operated with boom-equipped gas or electrical industrial trucks and in some applications can be attached to lift truck forks.

The magnets are furnished in sizes ranging from 12¼ to 36 in. in diameter, weighing from 155 to 1,900 lb. The 690-lb., 24-in. diameter magnet will lift a 6,000-lb. billet of slab, the 1,390-lb., 29-in. magnet will lift a 13,000-lb. 29-in. magnet will lift a 13,000-lb. billet or slab.

All of the magnets in the series feature bottom plates welded in place. Continuous welds between the inner and outer circumference of the bottom plate and the magnet core are said to provide a water-tight seal. Single-conductor, rubber-armored cables are brought out of the terminal boxes through compression glands and are secured to the magnet case by a strain clamp.

Electric Controller & Manufacturing Co., 2785 E. 79th St., Cleveland 4.



MULTI-STEP blocks and 3-in. riser

Aluminum Setup Blocks Prevent Table Nicking

Multi-step setup blocks of aluminum alloy that will withstand great weight under clamping pressure have been developed by Jergens Tool Specialty Co.

The manufacturer reports these blocks save machine setup time and, because of their relative softness, protect expensive machine tables from scratches and nicks. The blocks hold work from 0 to 3 in. They can be mounted on 3-in. high risers and pyramided from 0 to any desired height. The units are packaged in sets of four—two multi-step blocks and two risers.

Jergens Tool Specialty Co., 712 E. 163rd St., Cleveland 10.

Precision Instrument Dials Now Precision-Made

A new method of manufacturing dials for precision instruments is said to reduce possibility of error, according to its developer, Precision Photomechanical Corp.

In the manufacture of divided circles or dials, there are three prime sources of error, PPC states:

- Non-uniformity of spacing
- Non-uniformity of line width
- Eccentricity between center of generation and center of rotation.

The new process, utilizing an optical mechanical recording instrument, is said

to eliminate error from the first two sources and greatly reduce error from the third. With the process, dial graduations can be made of any width from as fine as three microns (.000120 in.) up to any size desired to meet commercial requirements.

The master dial is generated on a glass plate that is ground optically flat before it is made light sensitive. Its dimensional stability becomes that of glass. Photographically reproduced replicas are made by contact printing under vacuum and dial blanks printed from the master using a center hole of the same tolerance as the hole in the generated master. Using the center hole as a reference in machining operations insures absolute concentricity of the graduations with inner and outer diameters.

Precision Photomechanical Corp., 170 South Van Brunt St., Englewood, N. J.

ALSO ON THE MARKET

Airplane landing lamp with new filament base is said to provide longer, more uniform service life, more stable beam pattern, lower maintenance costs, greater assurance of safety than its predecessor. Named GE 4559, lamp is rated at 600 w., price is $10.75 plus tax.—General Electric, Lamp Division, Nela Park, Cleveland 12.

One-piece self locking locknut made of high tensile aluminum meets or exceeds minimum tensile requirements for steel nuts but is 65% lighter. Made of 24ST aluminum, the nut may be used on steel bolts and studs where temperatures do not exceed 250F. The new 105 FS Flexloc nut comes in five sizes 8-32, 10-32, ¼-28, and ⅜-24.—Standard Pressed Steel Co., Jenkintown, Pa.

Self releasing collets with clover leaf grind for use on lathes, collet fixtures, etc., are said to have 'slive' tension which makes release of collet and work easy. Wiping action between collet and closing sleeve eliminates accumulation of chips or dirt between the two.—Royal Products, Mineola, L. I., N. Y.

Moly Spray-Kote lubricant is sprayed on metal surfaces from pressurized aerosol container. It is non-inflammable and may be applied to hot surfaces. It is non-corrosive and non-toxic, does not contain resin binder. It dries quickly, leaving tenacious, long-lasting film. Maker recommends it for hot forming operations, for wear-in, gears, toggle joints, power screws and reciprocating parts in general.—Alpha Corp., 179 Hamilton Ave., Greenwich, Conn.

Scare Movie

The air transport industry has a public relations problem on its hands with **The High and the Mighty**, Warner Brothers screen adaptation of Ernest Gann's best-selling story of a terrifying airline flight from Honolulu to San Francisco.

Movie critics have seen the film, judged it, and set the tone for public reaction. The majority rate it among the top pictures of the year for dramatic presentation, but almost to a man they cite its possible adverse effects upon the mind of the air traveler and the potential air traveler.

Typical is Otis L. Guernsey, Jr., of the New York Herald Tribune. He opens his review with this ominous appraisal: "You may decide never to step into an airplane again after seeing 'The High and the Mighty.'"

Several airline officials frankly admit that the picture could have adverse effects. "The book was damaging enough," says one, "but a motion picture with a top rating will be seen by a large segment of the population. It could really hurt!"

To those in the industry, the story is loaded with too many improbabilities to be taken seriously. But there is a good chance that the uneducated layman will react to Warners' attempt at stark realism and take it very seriously.

This series of highly improbable events could well lead such a person to the conclusion never to fly again.

• Co-pilot Dan Roman (John Wayne), just prior to takeoff from Honolulu, vividly recalls his flaming crash of a few years ago. His confidence is shaken. Recollection comes from a small boy shooting a cap pistol at him.

• Pilot Sullivan (Robert Stack), with two million hours of safe flying behind

lum, is obsessed with the idea that the flight is ill fated before it ever leaves the ground. As the flight progresses, his obsession becomes more intense. When the crisis comes he goes to pieces.

- The four-engine plane loses a propeller. Propeller ruptures a wing tank, causing heavy loss of fuel. Engine is left hanging from nacelle.
- Can they still make San Francisco on the amount of fuel remaining with three engines, or will they be forced to ditch? The supposedly experienced navigator gets panicky, goes way off on his calculations by figuring statute miles instead of nautical miles. Ditching seems inevitable.
- Passengers are given instructions and prepared for ditching.
- Stewardess is shown sobbing at rear of cabin.
- Navigator regains his composure, takes another fix and concludes that they could make the coast if they can pick up 11 extra minutes of fuel.
- Mutiny takes place in the cockpit, with co-pilot temporarily taking command. Pilot has given up, feels that all is lost and wants to ditch immediately. Co-pilot slaps him around, takes over, begins cutting down on power to save fuel. Hysteria reigns in the cockpit for several minutes.
- Pilot, after some time, "comes to his senses." He then agrees that they have a slim chance of making it and resumes command.
- Aircraft makes dramatic approach into San Francisco, flying dangerously low, making perfect landing with 30 gal. of fuel to spare. —FS

Telling the Market

American Chemical Paint Co.'s check list of metal protective and paint bonding chemicals and processes has been put up in a new revised format. Write company at Ambler, Pa. . . . A new 28-page catalog (No. 1748) on its reinforced smooth line of grinding wheels has been published by Horton Co., Worcester 6, Mass. . . . A complete loose-leaf set of Civil Air Regulations and the Civil Aeronautics Manual is sold on a subscription basis by Rules Service Co., 726 Jackson Pl., N.W., Washington, with information brought up to date two weeks after changes are made.

Creep and Stress-Rupture Testing Apparatus, a four-page bulletin on machines used in testing special alloy steels used in high temperature service is published by Labquip Corp., 3521 Cicero Ave., Chicago 41. . . . "Flame-Plating," a 16-page booklet, covers a method of applying thin coatings of tungsten carbide on metal parts. Write Linde Air Products Co., 30 E. 42nd St., New York 17.

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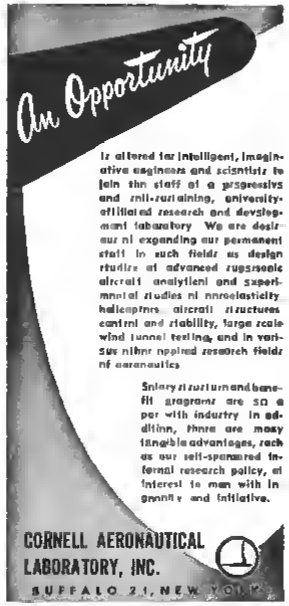

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P-3249, Aviation Week
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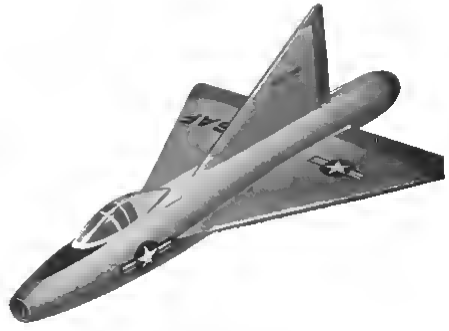

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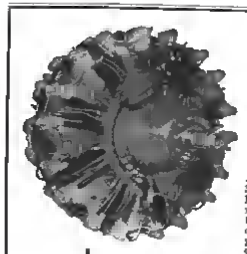

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CAL-Pioneer Merger Approval Expected

- **Purchase proposal wins CAB examiner's nod.**
- **But Continental-Braniff combine is ruled out.**

Merger of Continental and Pioneer Airlines appears certain following a recommendation by Thomas L. Wrenn, Civil Aeronautics Board examiner, that CAB approve the proposal.

If approved by the Board, the merger would be the first instance in which a trunkline purchased an operating local service airline, Wrenn says.

At the same time, Wrenn ruled out a Continental-Braniff Airways merger, investigation of which had been instituted by the Board and consolidated with the CAL-PAL case.

CAB ordered a Braniff-CAL merger investigation in case the record "dictated" disapproval of the voluntary agreement between Continental and Pioneer so that it would be in a position to determine if a BNF-Continental merger would be in the public interest.

▶**Substantial Savings**—Wrenn approved the CAL-PAL merger because:

- Integration of the two systems will result in substantial saving in aggregate need for mail pay of the two airlines.
- Routes will integrate satisfactorily from an operational standpoint.
- Competitive route structure of the area will not be altered materially.
- It will provide improvement in service to the public.
- It is consistent with Air Coordinating Committee's policy report to the President.
- It is consistent with the policy of the Board to maintain adequate local air service.

▶**Merger Plan**—Continental and Pioneer agreed last December (AVIATION WEEK Dec. 21, 1953, p. 69) to the following merger plan:

- Continental would pay Pioneer its net book value in cash at the time of the purchase plus 65,000 shares of CAL stock valued at $6 a share. Total purchase price would be paid partly by Continental's assumption of certain of Pioneer's liabilities.
- Routes of the two airlines would be combined and all personnel retained.
- PAL president Robert J. Smith and board chairman William F. Long would join CAL's board of directors, increasing its number from 11 to 13.
- CAL would retain Pioneer officers Harding L. Lawrence, Harold B. Seifert and E. W. Bailey.
- PAL stockholders would retain their shares in the separate Pioneer Aeronautical Services, a corporation formed to dispose of PAL's Martin 202 equipment returned from scheduled service when CAB refused to increase subsidies to operate the aircraft.

The contract is subject to approval of the Board, stockholders of both airlines, Chase National Bank of New York, creditor of both carriers, and First National Bank of Dallas, creditor of Pioneer.

▶**Less Subsidy**—In their joint application of merger, both airlines estimate their integration for the 12 months ending June 31, 1955, would result in $821,194 less break-even need and $916,030 less mail pay.

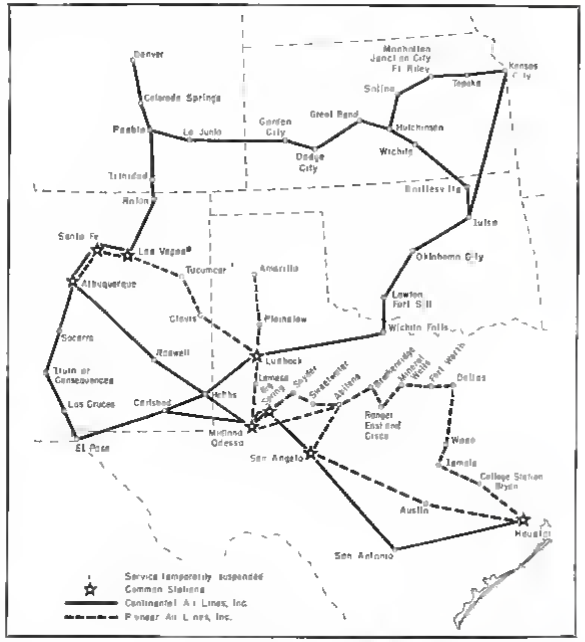
CAB bureau counsel said the merger would reduce their break-even need approximately $897,000 from the 1953 level. He did not estimate the reduction in mail pay that would follow the $897,000 break-even saving "since this would require a detailed consideration of the disallowance that may be made in a future rate proceeding," Wrenn reports.

"However," he adds, "bureau counsel is of the opinion that the estimated $897,000 reduction in break-even need would provide the basis for a substantial reduction in the subsidy mail pay required by the two carriers."

▶**Route Advantages**—As to integration of services, Wrenn finds:

"The Continental and Pioneer routes are joined at eight common points, four of which (Houston, Tex., Albuquerque, N. M., Lubbock, and Midland-Odessa, Tex.) are major operational centers for both carriers. The Pioneer system fits into the Continental system with three of the common stations presently in operation by both carriers at the center of Pioneer's system.

"The number, geographic location



CONTINENTAL-PIONEER ROUTES now total 5,167 mi., join at eight common points

and operational importance of these common stations present material advantages from the standpoint of conducting operations over the two systems by facilitating the routing of aircraft and the consolidation of duplicating facilities.

"Review of eight mergers, acquisitions and consolidations involving domestic airlines approved by the Board, shows only one instance (the Braniff-Mid Continent merger) in which the number of common stations equalled the number of common points in the Pioneer-Continental system."

The CAL-PAL integration will provide improved service to 30 cities in Texas, New Mexico and Oklahoma, he reports. Based on proposed schedules, the combination carrier will offer "first new one-carrier service to 25 pairs of cities between which 8,340 passengers travelled in 1952."

Among the principal beneficiaries of new through-plane service would be Austin-El Paso, Tex., Roswell N. M., and Carlsbad, N. M., and Hobbs-Dallas/Fort Worth, Tex., Continental and Pioneer told the examiner. The New Mexico cities also would be given one-carrier, one-plane service to Houston—their principal port.

▶**AA Competition**—"The record clearly demonstrates that the proposed acquisition will not materially alter the route structure in the area, create a monopoly or jeopardize other carriers," according to Wrenn. "... Integration of Continental and Pioneer will eliminate competition in only four markets, none of which average more than three pasengers per day.

"It would provide a multi-stop competitive service to that of American in the El Paso-Dallas/Ft. Worth market where there is an average of 40 passengers per day and would establish competition in Braniff's San Antonio-Amarillo and Lubbock and Austin-Denver and Colorado Springs markets. The traffic in each of those particular markets averaged less than four passengers per day."

▶**BNF-CAL Ruling**—Discussing the Braniff-Continental merger possibility, Wrenn holds that:

• Such a merger substantially would reduce the break-even need and total mail pay need, although not enough to render either airline subsidy-free. Bureau counsel estimated that traffic increases resulting from the combined operations and the savings effected through elimination of duplicate costs at common stations would reduce break-even need by $1,436,000. No estimate was made of reduction in total mail pay need.

• Break-even need savings do not include any consideration of costs that might result to the integrated carrier for adversely affected employees.

• Braniff's estimate of a reduction in combined mail pay of $680,422 would not be a net saving to the taxpayer since other airlines would suffer serious diversion of traffic to the integrated system.

It is possible, he says, to arrive at a firm estimate of the diversion that would result since "there is no integrated schedule pattern in the record upon which the other carriers could predicate their estimates."

• Attitude of the parties toward an integration prevents a merger now. Continental is opposed to integration at the present time, "Braniff says that it has some merit and is willing to negotiate, but the testimony of Braniff's president could hardly be described as enthusiastically supporting such an integration," Wrenn reports.

"Moreover the record shows that Braniff has some financial problems which might have considerable influence on the ability of the parties to agree on the means and terms of payment to the selling carrier," he says.

Wrenn concludes that if the two airlines could agree on terms, there is nothing in such a transaction that "would be inconsistent with and adverse to the public interest."

Combination 377s

Pan American World Airways is converting its entire trans-Pacific fleet of 17 Boeing Stratocruisers to combination aircoach-first class configuration, basing the change on the success of five 377s operating since Apr. 1 on PAA's San Francisco-Honolulu route.

Conversion of a sixth transport this month permitted extension of the service to Tokyo this month. Los Angeles-Tokyo flights will start Aug. 1. Conversion of the entire fleet, will cost approximately $1.7 million.

U.S. Airliners Battle Viscounts in Australia

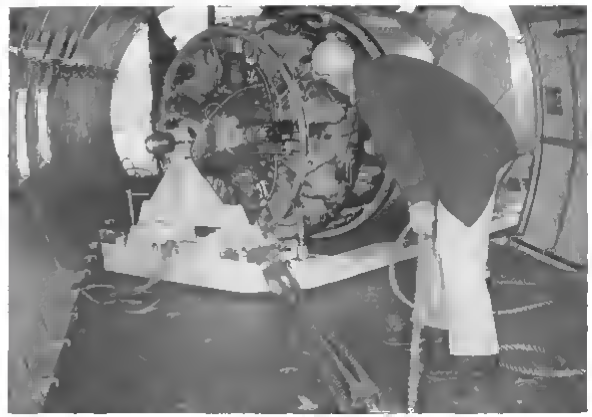
(McGraw-Hill World News)

Melbourne—Australia's domestic airlines are pitting U.S. piston-powered transports against British turboprops in an advertising and public relations battle for increased traffic.

Ansett Airways is booming the merits of two Convair 340s on order. Australian National Airways is pinning its hopes on two Douglas DC-6Bs scheduled for delivery in the first part of 1954, and Trans-Australia Airlines is waging a campaign based on expectation of early delivery of six Viscounts.

Ansett's 52-passenger 340s, sister ships to the airline's already-popular 240s, will be combined with special concessions and lower fares than those charged by ANA and TAA.

Industry observers here predict that Australian National and Trans-Australia will not be able to meet the lower rates because of the cost of new equipment plus wage increases demanded by pilots.



Gadget 'Squeezes' Turbo Compound Into DC-4

Engineers at United Air Lines' San Francisco "push button" base have designed a 3,000-lb. steel engine stand to load Wright R3350 Turbo Compound engines into its DC-4s. A conventional stand will not clear the DC-4's loading door. But retractable casters and screw jacks built into the corners of the new stand allow the device to be lowered for loading, then raised once it is inside for rolling into position. Clearance at the top is less than an inch. Stands are built by Texas Metal & Mfg. Co., Dallas.

U.S. Studies Middle East Airlines

FOA aviation consultants preparing recommendations to bolster West defenses on Iron Curtain borders.

By Richard Balentine

Development of local Middle East airlines to assist in closing the gap in the West's defense perimeter bordering Russia and Red China is being studied by a four man consulting team of aviation experts working for Foreign Operations Administration.

Headed by Allan F. Bonnalie, director of flight training for United Air Lines and former president and general manager of Lineas Aereas Mexicanos S.A., UAL's Mexican subsidiary, the consultants will provide FOA with recommendations on how to develop properly the small Middle Eastern airlines by giving them:

- Technical assistance
- Economic aid
- Mutual security

As devised by FOA, the airline program is a part of Secretary of State John Foster Dulles' program to seal off the nearly 1,200 mi. of undefended territory between Turkey and Pakistan through which the Russians presumably could invade the West.

Threatened are:

- Suez Canal Zone
- Vital Persian Gulf oilfields
- Pakistani airfields at Dalbandin, Pishin and Quetta
- Important port of Pakistan's capital, Karachi

It is the Secretary of State's plan to provide these Middle Eastern countries—including Iraq, Iran and Afghanistan—with sufficient aid to bolster their defenses and make them strong individually and collectively to guard the Middle Eastern front. This would establish what is being called the "Dulles Line."

Senate Majority Leader William F. Knowland has said this plan might well become Secretary Dulles' "master stroke in geopolitics."

▶ **Airline Role**—Limited and often primitive railway and highway facilities in the countries concerned have provided aviation a principle role in recent years in bettering the welfare of the populace. Now that their welfare is so vital to the maintenance of peace within the free world every effort is being made to strengthen these countries internally.

That's where the local airlines come into the picture.

"Our purpose is to build up these local carriers," says Bonnalie, "for it has been realized that in order to contain communism we must also build up the standard of living of the people."

▶ **On the Spot**—Bonnalie's advisory team is working strictly as a consulting group. No funds have been made available for operations. Their work will result only in recommendations to FOA.

Trips to the Middle East will be made eventually, Bonnalie says, in order to obtain on-the-spot information of the foreign airlines concerned. Countries with "most pressing" problems will get first attention.

Effort will be made, he says, to recommend measures that can pay for themselves or be self-supporting in a reasonable period of time. In some cases, U.S. airlines may be called upon to supply financial and advisory aid to the Middle Eastern airlines.

▶ **CAA Role**—Such action would be similar to Trans World Airlines' move in Ethiopia several years ago when TWA began operation of Ethiopian Airlines. The country gained economically through the effort, and TWA added considerable traffic to its international routes.

Civil Aeronautics Administration also will be considered in the consultant's program since CAA has established and operates aeronautical facilities throughout the Middle East.

"Any government agency whose services may be useful in development of these airlines," Bonnalie says, "will be considered in our recommendations."

A team of CAA international experts returned earlier this year from an investigation tour of the Middle East for FOA (AVIATION WEEK Apr. 26, p. 81). Among their recommendations was modernization of Devlet Hava Yollari (DHY), nationalized Turkish airline.

▶ **May Extend Work**—FOA's aviation advisory team will deal strictly with the Middle East at the present time but before long their activity may be extended to other points of the globe where a similar situation exists. The assignment is concerned only with the civilian aspect of local transportation, Bonnalie says.

Bonnalie, a retired rear admiral of the Naval Reserve, was selected to head the consulting team by W. A. Patterson, UAL president, when Patterson was asked for assistance by Harold Stassen, Foreign Operations Administrator. FOA wanted an airline expert whose company had no interests in the Middle East.

Assisting Bonnalie are:

- **George R. Cory**, former vice president of American Airlines in Mexico.
- **John T. Milliken**, economist formerly employed by Lansa in Mexico.
- **Byron F. Sherrill**, former chief pilot for Overseas National Airways during the Korean airlift and onetime pilot for China Airways and Pan American World Airways.

Airline Policies Must Lure Investor: Murray

Air transport industry can be subsidy-free and self-reliant only if it is in a position to attract the confidence and support of private investors, Robert Murray, Commerce Undersecretary for Transportation, believes.

"Neither the industry itself nor the policies of government have been successful," says Murray, "until there can be shown a solid record of gain in winning the interest of the private investor."

▶ **'Something Wrong'**—"Unhappily, the record in this connection leaves much room for improvement," he warns. "We must face the fact that, in general, the man with a dollar to invest does not yet regard the air transport industry as a particularly desirable place for his money.

"As long as the investor remains cool, there is something wrong. The great problem before us in the immediate future is to make sure that the policies of private management and the policies of government will permit enough earnings to win the support of private capital."

▶ **Policy Framework**—Murray spoke before the annual airlines operations conference at Williamsburg, Va., giving an explanation of the Air Coordinating Committee's air transport policies. He serves as ACC chairman.

The committee's report was accepted recently by President Eisenhower as a "guide in the future consideration of questions related to the subject of civil aviation and in making appropriate recommendations to Congress."

"The report ... provides a framework of federal aviation policy which is suitably related to the growing maturity of this industry—a policy which will enable the industry to realize fully the type of development required in the public interest," Murray explains.

▶ **Self-Sufficiency Potential**—With respect to domestic air transport operations, Murray states, ACC has concluded that the industry now is in a position where affirmative steps can be taken to move in an orderly fashion toward a subsidy-free status.

"We are convinced that there is now within the domestic air transport system a basic potential for sustained self-sufficiency, provided that necessary adjustments are made in route structures and in the industry's organization," he says.

Murray believes the goal of self-sufficiency can be achieved mainly by prompt action by industry and government to effect route modifications, mergers and other adjustments "required to strengthen the industry and give it the fullest possible opportunity for meeting a reasonable schedule for subsidy withdrawal."

In exploring the field of domestic route adjustments, Murray notes that in 1952 there were some 50 airline points that enplaned an average of less than one passenger a day, and about 140 had less than three passengers each day.

Murray says some international routes will have to be maintained for broad reasons of national interest "despite the absence of any clear economic justification." ACC policies "particularly favor the elimination of any unnecessary and uneconomic duplication of services between U.S.-flag carriers," he adds.

▶ **Nonsked Policy**—Commenting on the ACC policy toward nonscheduled airlines, Murray says: "Our policies concluded that the general exemption provision of the Civil Aeronautics Act should not be used as the basis for any large-scale departure from the clearly intended requirement for the certification of common carrier services.

"And it goes without saying that there should not be delay in assuring that the terms of the present nonscheduled exemption are observed in those cases where existing authority has been exceeded."

▶ **Policy Dissents**—Meanwhile, ACC's report drew criticism from the two Democratic members of Civil Aeronautics Board, Josh Lee and Joseph Adams. Principal target of the criticism is the ACC policy on mergers of local service carriers.

Adams states "... In the absence of a careful consideration of all the public interest factors—and not subsidy alone—I do not agree that our well-established local air service system should be disrupted or eliminated by announcing ... that the one factor of cost is to determine whether cities, routes, or entire systems should be transferred from local service to the trunkline service category, and that absent such transfer, true local air service to these cities, routes or local systems will be entirely eliminated."

Lee states: "I cannot subscribe to any statement of policy which, under the guise of effectuating savings in subsidy, proposes to eliminate the local service industry by permitting trunks to absorb the route systems of the local carriers.

"I, too, favor the reduction and elimination of subsidy but am unwilling to concede that the transfer to the trunks of the smaller communities would in the long run result in any beneficial economies to the government. On the contrary, I fear that much we have achieved during the past 10 years in developing a broad base for the air transportation industry would be sacrificed."

26-Cent Mail Rate

Provincetown-Boston Airline has won a three-year star route mail contract from Post Office Department with its offer to transport mail at about half the cost paid the "Big Four" carriers.

The contract calls for payment of two cents a pound on shipments of mail—not only six-cent airmail letters but also three-cent letters, postcards and newspaper individually wrapped—between Boston and Provincetown, a distance of 150 mi.

This is a ton-mile rate of 26 cents, compared with the lowest scheduled airline mail rate, that of the "Big Four," of 45 cents a ton-mile.

Sen. John Kennedy, perennial Capitol Hill critic of airline subsidies, praised the Post Office action. "The Provincetown-Boston Airline will fly the mail at less than half of the company's airfreight rate ... is not seeking a cent of subsidy.

"To illustrate the example of economy set by this contract, it should be noted in comparison that local service or feeder airlines elsewhere in the country obtain airmail and subsidy pay of six to 20 times their airfreight rates and, under rate orders of the Civil Aeronautics Board, our international airlines receive airmail and subsidy payments of more than four times their freight rates."

CAA Changes Asked In Bill Amendment

Civil Aeronautics Administration would be established as an independent agency under an amendment which has been proposed to a comparatively minor aviation bill.

It was offered by Sen. Herman Welker "to restore to complete independence the agencies charged with the duty and responsibility of administering civil aviation laws and policies with a minimum of reorganization and legislative change."

The measure to which Welker offered the amendment re-defines "airman" in the 1938 Civil Aeronautics Act with the effect that employes of certificated manufacturing and repair stations would not have to be certificated individually.

CAB ORDERS

(June 16 22)

AMENDED

Transocean Air Lines exemption to operate a roundtrip flight between New York and Beirut, Lebanon, by making Cleveland the point of departure in the U S

Former approval of common control by Reed Pigman as president of both American Flyers Airlines Corp, an irregular carrier, and American Flyers Inc, to add the following officers to an interlocking relationship A B Crockett, vice president of both companies and V O Coggins, director of both companies

DENIED

Seaboard & Western Airlines' application to operate two roundtrip flights between New York and Beirut, Lebanon, between June 20 and Oct 12 for Lebanese pilgrims

Motions of Delta C&S Air Lines, Minneapolis St Paul Metropolitan Airports Commission, cities of Milwaukee, Wis, and Rochester, Minn, and Braniff Airways to be included with the joint application of Northwest Orient and Eastern Air Lines for through plane service between Minneapolis St Paul and Miami via intermediate points

Applications of Great Lakes Airlines, Currey Air Transport and U S Airlines to carry first class and other preferential surface mail for the Post Office

Reconsideration petition of city of Charlotte, N C, and its chamber of commerce and Greensboro High Point Airport Authority requesting that Charlotte and Greensboro High Point be designated midway cities in the additional Southwest-Northeast service case

Overseas National Airways' application for an exemption from the tariff filing provisions of the Civil Aeronautics Act in order to engage in charter transportation for U S armed services without observing tariffs on file with CAB

APPROVED

Intercompany agreements between Delta-C&S and Eastern Air Lines and various other air carriers

Seaboard & Western Airlines operation of one roundtrip flight of Lebanese pilgrims between New York and Beirut, Lebanon, between June 20 and Oct 5

GRANTED

Air Line Pilots Assn International, Milwaukee Assn of Commerce, Capital, Delta C&S, National and Braniff leave to intervene in the application of Northwest and Eastern to provide through plane service between Minneapolis-St Paul and Miami via intermediate points

Western Air Lines leave to intervene in Pacific Western Airlines' application to perform operations of a casual, occasional or infrequent nature in common carriage into the U S

Minneapolis-St. Paul Metropolitan Airports Commission leave to intervene in Eastern Northwest application for an interchange agreement

American, Continental, Eastern, Delta C&S and Pioneer Air Lines, Air Line Pilots Assn, the Postmaster General and several cities and chambers of commerce permission to intervene in Trans Texas Airways' application for renewal of its temporary certificate

(June 21 30)

DISMISSED

Empire Airlines application for certificate of public convenience without prejudice

Proposals of Curtis Air Transport Ltd Great Lakes Airlines and Monarch Air Service for family plan fares

APPROVED

Intercompany agreements between United Air Lines and West Coast Airlines and various other air carriers

Agreements between various air carrier members of Air Traffic Conference of America, Independent Military Air Transport Assn and Aircoach Transport Assn for extension of military tenders for transportation of military personnel for fiscal year beginning July 1

Seaboard & Western Airlines application to fly one roundtrip flight between New York and Beirut, Lebanon departing from New York June 27 and returning on or about Oct 12

GRANTED

National Airlines, Delta C&S Air Lines United Air Lines, American Airlines, Western Air Lines, Capital Airlines, Eastern Air Lines, Continental Air Lines, Trans World Airlines, Northwest Airlines, Braniff Airways, Defense Department Society of American Florists, Minneapolis-St Paul Airport Commission, City of Columbus, O, Columbus Chamber of Commerce, commonwealth of Kentucky, Department of Aeronautics, Louisville and Jefferson County Air Board and Louisville Chamber of Commerce, and Postmaster General permission to intervene in the airfreight certificate renewal case

National Airlines an exemption until Nov 5 to provide free transportation to a technical employe of Consolidated-Vultee Aircraft Corp and two from Douglas Aircraft Co for the purpose of making technical inflight observation of Convair 340 and DC-7 aircraft

Pioneer Air Lines a temporary exemption to serve Big Spring, Tex

CERTIFIED

Proposed Star Route for transportation of airmail to and from Los Angeles or Long Beach, Calif, and Avalon, Calif, and to and from Boston, Mass and Provincetown Mass

ORDERED

Information contained in a contract of Capitol Airways withheld from public disclosure

Pacific Northern Airlines to show cause why CAB should not fix its mail rates

EXTENDED

Purdue Aeronautics Corp exemption to operate charter trips for 60 days

AMENDED

Continental Air Lines exemption by extending it for one year to carry technical personnel of Pratt & Whitney Aircraft, Hamilton Standard, Bendix Aviation, AiResearch Mfg, Sperry Gyroscope, Convair and Douglas Aircraft Co

SHORTLINES

► **Continental Air Lines** reached new traffic highs in June, flying 35,605 passengers 14,277,755 revenue passenger miles . . CAL carried 33% more mail during May than in the same month of 1953

► **National Airlines** reports a 200% increase in sales of "piggy bank" package vacations to Florida during the past year, an indication that summer travel to Florida may surpass NAL's winter business

► **Northwest Orient Airlines** has deactivated its refueling base at Shemya Island, 35 mi from the end of the Aleutian chain, and is operating its trans-Pacific Boeing Stratocruisers and DC 6bs in and out of Thornbrough Airport at Cold Bay, Alaska, 950 mi east of Shemya on the tip of the Alaska peninsula.

News Sidelights

Local service airlines have brought more members of Congress into CAB hearing rooms to support certificate renewals than airline people have seen in some time. There is responsible opinion that this evidence of interest on Capitol Hill has turned the tide in the feeders' favor and that few companies will not have their rights renewed. Some route adjustments and mergers other than the Continental-Pioneer deal (p. 76) are expected, however.

The Washington outlook for scheduled cargo carriers has not improved in recent weeks and there is increasing opinion in well-informed circles that future certificate renewals in this category will be sparse.

Air Coordinating Committee's Civil Air Policy Report still is one of the major aviation subjects of controversy in Washington, although it has been released since May. There still is frequent expression of indignation in Democratic National Committee circles that Commerce Department (or Eisenhower Administration) should feel it has any policy powers over CAB. The Board, Democrats contend, is a quasi-judicial agency, a creature of Congress, and when Congress wishes CAB to change its ways Congress will change the Civil Aeronautics Act.

The ACC's report is expected to have more effect on international airline cases than domestically, since such decisions must be cleared with the White House before they are released and the President can order changes along the lines of Administration policy.

United Air Lines has released nine more DC-6s for conversion to aircoach services, made possible by additional deliveries of DC-7s. President Patterson says as of Apr. 30 United was operating 25% of its mileage as coach, against American's 18% and TWA's 48%. UAL will expand this figure to 37% in the next few months. Many of United's DC-3s are for sale, DC-4s will be used in coach work "as long as there is a demand for them," Patterson says.

Some of the highest Washington circles interested in aviation feel that there are too many airlines in Alaska and further action over coming months to cut the number of carriers there should not be unexpected.

Cities that have been granted aircoach service by the scheduled carriers have generated bigger increases in first-class traffic than cities without scheduled tourist service, one economic study reveals. If true, this result would seem to give the lie to those who say that coach is diverting considerable first-class business.

A Boeing executive told a Los Angeles audience last week that the F-99 is "not in production yet."

First operational unit of F-100s activated will be at George AFB, Calif.

Helicopter shuttle service will be available between the Atomic Energy Commission's Oak Ridge, Tenn., facility and Knoxville Airport, for travelers on official business beginning Aug. 15. Using a Sikorsky H-19 (S-55) loaned by USAF, the new AEC service will save about one hour in travel time between the two points. More than 1,000 passengers a month use Knoxville Airport on official AEC business.

More than 325 flights have been made by Allison Division's turboprop-powered Convair 240, which has two 2,925-hp. T38s and Aeroproducts props. Recently, Assistant Secretary of the Air Force Roger Lewis and his party flew in the turboprop 240 from Allison to St. Louis, the next stop on their nationwide tour.

French recently got two new military planes off on first flight: a two-place Nord 3 201 trainer and the May Holste 1521 which differs from the previous version in having lower landing gear with low-pressure tires and larger wing flaps. The Nord is a low-wing fixed landing gear type powered by a 170-hp. Snecma engine weighing 2,000 lb. loaded. A second prototype, powered by a 260-hp. Argus engine, is expected to fly soon.

AVIATION CALENDAR

July 27-Aug. 5—21st National Soaring Contest, Elsinore, Calif.

Aug. 1-7—International Astronautical Federation, fifth annual congress, Innsbruck, Austria.

Aug. 7-8—Experimental Aircraft Assn., fourth annual National Air Pageant and second annual fly-in and convention, featuring "home built" aircraft, sportsplanes, racers and antiques, Milwaukee.

Aug. 9-10—American Society for Quality Control, national conference of Aircraft Technical Committee and first annual Western Regional Conference. U. S. Grant Hotel, San Diego.

Aug. 9-11—Institute of the Aeronautical Sciences, turbine-powered air transportation meeting, Seattle.

Aug. 9-20—California Aviation Education Assn.'s workshop, College of San Mateo, San Mateo, Calif.

Aug. 25-27—Western Electronic Show & Convention (WESCON), sponsored by West Coast Electronics Mfg. Assn. and Institute of Radio Engineers, Ambassador Hotel, Los Angeles.

Sept. 4-6—National Aircraft Show, Dayton, Ohio.

Sept. 7-12—Society of British Aircraft Constructors 1954 Flying Display, Farnborough, England.

Sept. 8-11—Symposium on propagation, standards and problems of the ionosphere, sponsored by National Bureau of Standards, Central Radio Propagation Laboratory, Boulder, Colo.

Sept. 13-24—Instrument Society of America, first International Instrument Congress and Exposition and third annual Analytical Instrument Clinic, Philadelphia.

Sept. 19-21—International Northwest Aviation Council, 18th annual convention, Hotel Vancouver, Vancouver, B. C.

Sept. 21-23—Society for Experimental Stress Analysis, annual meeting and exhibition, Bellevue-Stratford Hotel, Philadelphia, Pa.

Sept. 30-Oct. 1—Radio Technical Commission for Aeronautics, fall assembly, Washington, D. C.

Oct. 4-6—Tenth annual National Electronics Conference, Hotel Sherman, Chicago.

Oct. 5-7—Champion Spark Plug Co., 10th annual Aircraft Spark Plug and Ignition Conference, Secor Hotel, Toledo, Ohio.

Oct. 5-9—Society of Automotive Engineers, National Aeronautic Meeting, Aircraft Production Forum and Aircraft Engineering Display, Hotel Statler, Los Angeles.

Oct. 17-22—International Union of Aviation Insurers, annual general meeting, New York.

Oct. 18-22—National Safety Council Aeronautical Section, Conrad Hilton Hotel, Chicago.

Nov. 8-9—National Aviation Trades Assn., annual convention and meeting, Biltmore Terrace Hotel, Miami Beach, Fla.

Nov. 8-10—Air Industries & Transport Assn. of Canada, annual meeting, Chateau Frontenac, Quebec City.

Nov. 10-12—Industrial Management Society, 18th National Time and Motion Study and Management Clinic, Hotel Sherman, Chicago.

Nov. 12-14—Texas State Aviation Convention, Galveston, Tex.

ADVERTISERS IN THIS ISSUE

AVIATION WEEK—JULY 26, 1954

SEARCHLIGHT SECTION

(Classified Advertising)

H. E. Hilty, Mgr.

Wipe Out the Blind Spots!

A kid stepped unnoticed into a private plane at an important metropolitan airport, parrotted the routine radio patter for clearance and took off. Fortunately, he hopped safely over a congested building area before he crash-landed. No one died. After the act, the federal officers from Civil Aeronautics Administration moved in fast! It turned out the youthful pilot had no credentials, and never had possessed any.

A pilot of a twin engine charter carrier's transport started a takeoff at a New York airport with about 15 passengers one night not long ago. Something happened and the takeoff was aborted. A sharp swerve kept the ship from rolling over the seawall. Not many minutes later the pilot tried it again, and there was trouble again. The pilot groundlooped his ship. The right brake caught fire and the plane wound up in an area that had been vacated a few minutes earlier by several gasoline trucks. The airport fire department extinguished the blaze and the pilot elected to try it again. This time he made it safely—out over the crowded residential district adjoining the airfield.

'After Hours'

In the meantime, an airport executive had been trying to locate a CAA inspector. It was "after hours," and the night before a holiday week-end. CAA men were exceedingly hard to find. One finally was contacted and the incident was reported in the hope that the pilot at least would be met in Chicago and compelled to make a full report on the matter—if he got that far.

These incidents are not as unusual as some of us in aviation would like. And if either plane had plowed into streets, homes, apartments or stores with loss of life to citizens, do you think the public would have understood why either of these men was permitted to take off?

Aviation has grown at a phenomenal rate. There are bound to be blank spots technically, operationally, legally, procedurewise. There also are blind spots in our thinking. We are so accustomed to the status quo that we sometimes appear incapable of detecting these blank spots, or realizing the potential penalties we may incur if we fail to correct them.

We should be searching for these blind spots every hour of every day, and taking prompt remedial action when we find them.

Encouraging as our progress in safety has been in many respects, there still appears to be a singular lack of interest in some of these blind spots—an inexplicable lack of awareness of the dangers involved.

Remember Public Opinion

Newark Airport was forced to close down for weeks because of an outraged public opinion following three air crashes in that populated vicinity. Such a drastic measure never had occurred before in aviation history.

But the precedent has been set and who would be brash enough to deny that it can happen again in the same congested area or another?

One of these important blind spots is the complete lack of any official screening of non airline pilots before takeoff. Airline pilots are supervised carefully. But at most fields there is little done to prevent anyone pilot or not, from entering the first plane he can, calling for clearances, and starting a takeoff. A tower seldom denies takeoff approval for reasons other than traffic, orders are orders.

The public has a right to legal and adequate protection from irresponsible actions of those who fly. On the books, provision is there for enforcement. But enforcement of these types of infractions is seldom preventive. It usually follows completion of the violation—if anyone remains alive to be punished.

Who and what machinery are set up to make any effort to keep the irresponsible or unqualified pilot from taking off on what is obviously foolhardy or dangerous flight? Certainly, no airtight system would prevent all accidents, but some screening system would be far superior to none at all, and the well publicized knowledge that a federal officer was on duty at every sizable airport every hour of the 24 would in itself be a deterrent to foolish attempts.

A Dangerous Gap

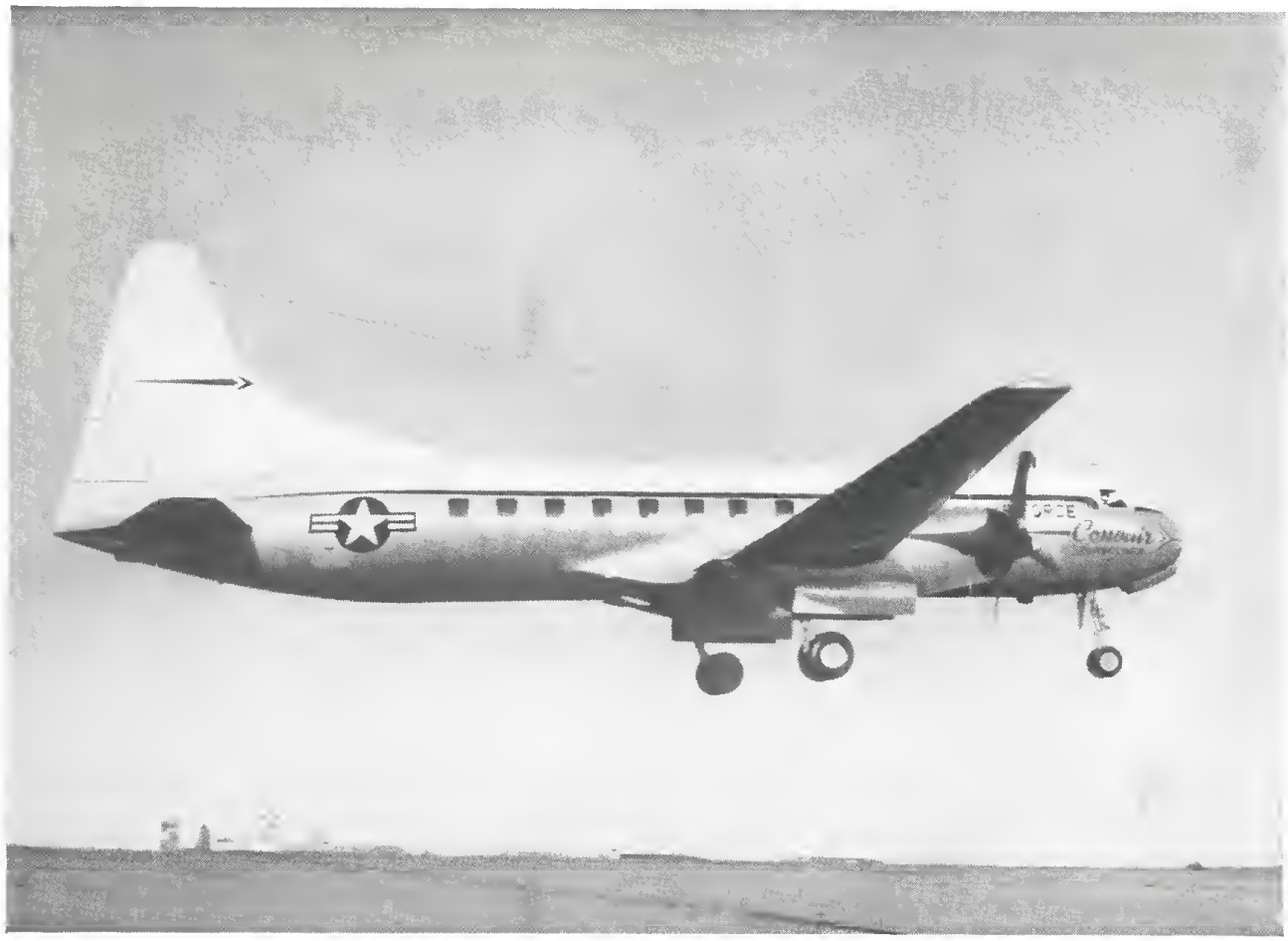
There is a dangerous gap between the official administration of responsibilities of airport management on one hand and those of the government on the other, and this gap needs closing.

There was no one at the airport that night to check in the charter pilot before he boarded his transport for his three takeoffs for Chicago. Was he a licensed pilot and was he carrying his necessary credentials? Was the certificate his own? Was it still in effect? Did it permit him to operate this class of aircraft? No one knew before he took off. You can repeat this situation hundreds of times a day in this country at busy commercial airports—for most non-airline flights. Yet we take it for granted. It is time to change our nonchalant attitude.

Civil Aeronautics Administration inspectors, the public's protectors, are stationed at most major airports. But for only eight hours a day, from 8:30 to 5, with a half hour off for lunch, 40 hours a week. They are off duty on Saturdays and Sundays! Why shouldn't any indignant citizen take a dim view of such a setup—unless all aviation were closed down at 5 P. M. each day, and all day Saturdays and Sundays.

What kind of public protection is it that permits any Tom, Dick and Harry to board any plane he can get into, at virtually any civil airport in the country and with the use of the proper bit of radio jargon take off without the slightest difficulty?

We in aviation need to grow in social awareness to the point where we become aghast at the chances we have been taking. We should become exceedingly jealous of the importance of our role in protecting the public on the ground as in the air. —Robert H. Wood



THE AIRFRAME'S THE SAME —THE POWER'S TURBO-PROP

Here is the Convair YC-131C Military Transport, a conversion to Allison Turbo-Prop power of the Model 340 Convair-Liner. Modified under an Air Force contract, the YC-131C is now flying powered by two Allison YT56 Turbo-Prop engines driving Aeroproducts propellers.

With this installation the Air Force is leading the way in testing the practical operating usefulness of Turbo-Prop engines—paving the way for the change from reciprocating to Turbo-Prop engines in transport and logistic aircraft.

Allison Turbo-Prop design and performance characteristics can help today's transports meet tomorrow's advanced operational requirements of:

- **Increased Payloads**
- **Higher Cruising Speeds**
- **Lower Fuel Cost**
- **Less Maintenance Time and Cost**
- **Shorter Take-offs and Landings**
- **Greater Passenger Comfort**
- **Reduced Ground Handling Time**
- **Reduced Crew Fatigue**

Since December 1950, Allison has conducted extensive flight tests with its own Turbo-Liner to exploit the advantages inherent in Turbo-Prop power for transport service. In addition, the Navy is accumulating experience in the Douglas A2D Skyshark and the Convair R3Y Tradewind—also powered by Allison Turbo-Prop engines driving Aeroproducts propellers.

Today that pioneering is paying off in the availability of Turbo-Prop engines and propellers which will enable military and commercial aircraft to carry bigger payloads, farther, faster and more economically.

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